ERT

GUIDE TO DEPLOYMENT MANAGER

December 2019

Overview

Deployment Manager is a web-based application that provides a live web view of the data, the locations of the instruments and trend graphs for each instrument sending data. Data is also displayed via an Esri Leaflet map and automatically updates with new readings showing the real-time movements of mobile survey teams. Data from the field that is received in Deployment Manager can be configured to calculate Numeric, Vector, and String alarms, as well as Rolling TWAs, Vector Rolling TWAs and Conversion Factors for a parameter in real-time. These TWAs can be adjusted to average by any number of minutes, hours or days. Instrument-specific alarms for a native sensor or a calculated parameter can be set, and email alerts and text message notifications can be configured based on those alarms. In addition, Connection Status Notifications can be enabled to send an email alert or text message if the instrument(s) have been *Down* or *Intermittent* after a certain period of time.

The following Guide addresses how to access the Deployment Manager web site, as well as options for alarm types, graphing and viewing data, exporting data and viewing data on a map. Currently, establishing monitors, alarms, notifications, linking and annotating are features that can only be created by calling ERT Software Support. Please contact them via e-mail to ertsupport@epa.gov or by phone at 1-800-999-6990.

Section 1 - How to Register and Login to Deployment Manager

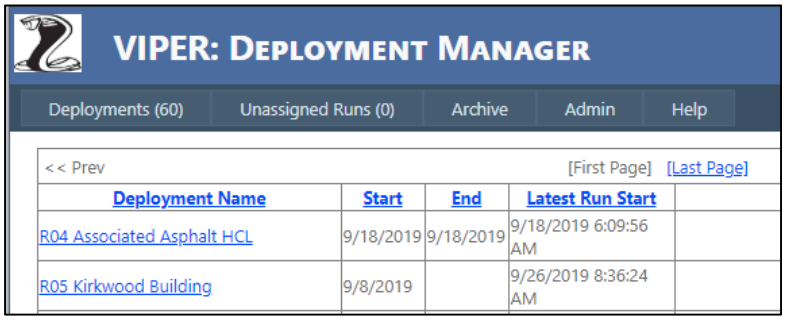
Login credentials for Deployment Manager are managed through ERT's Single Sign On authentication service. The single sign on feature requires users of Deployment Manager to have an account on the OSC Website (Response.EPA.Gov) in order to authenticate and login to Deployment Manager.

Option 1 - Users with an Existing Response.EPA.Gov account

1. Open your internet browser and navigate to https://viper.ert.org

2. A login screen similar to the one shown here will be presented. Enter your response.epa.gov (OSC Website) credentials and click Login

After successfully logging in, all deployments to which you have access will be listed in Deployment Manager.



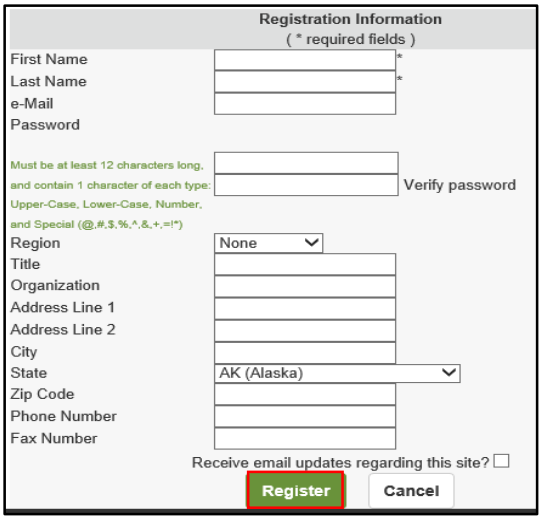
NOTE: If you do not see the deployments you expect, make sure you have been added as a contact with rights to view **'Private'** content on the response.epa.gov website that has been associated with the deployment. For additional information, please contact ERT Software Support at 1-800-999-6990 or email to ertsupport@epa.gov.

Option 2 - Users without an Existing Response.EPA.Gov account

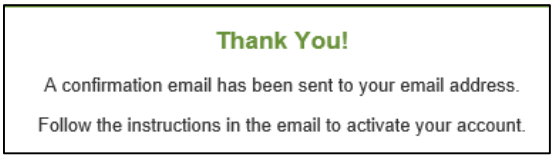
1. Open your internet browser and navigate to https://viper.ert.org

2. Select the link to “Register here”

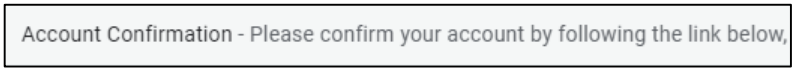
3. Complete the Registration Information
4. Click the Register button



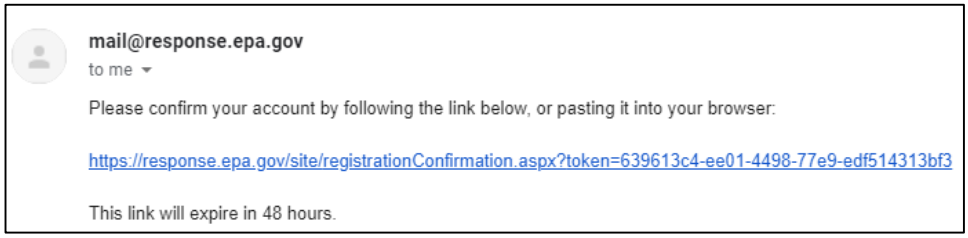
5. You will receive the following confirmation notice directing you to your e-mail account.



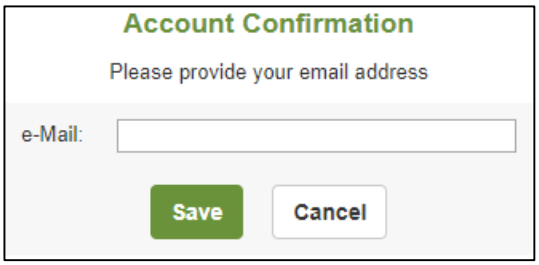
6. Open the e-mail account used to register and look for a message beginning with the subject shown here



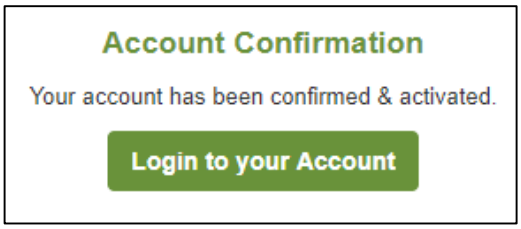
Open the e-mail and follow the instructions to click the link to confirm your account



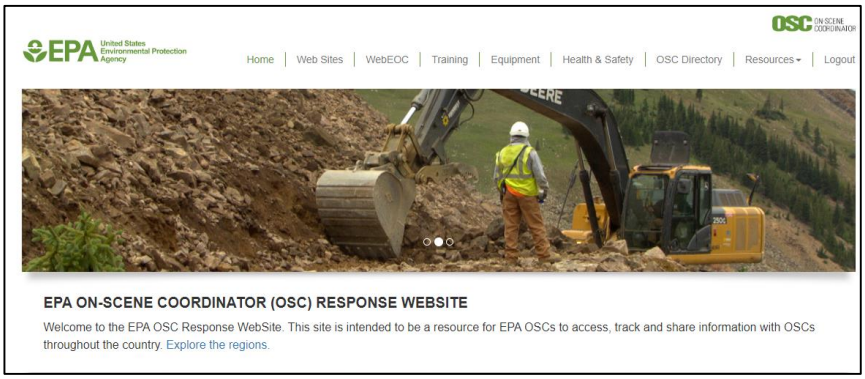
7. After clicking the link in the e-mail, an account confirmation window will be displayed. Enter the e-mail address used to register and click the Save button



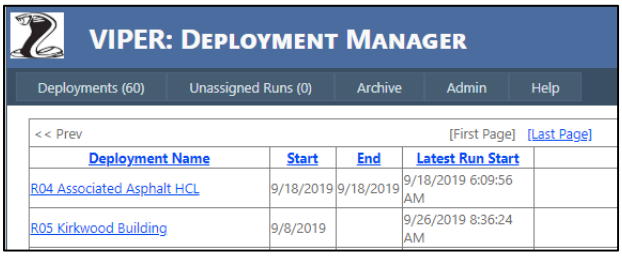
8. A final account confirmation window will be displayed. Click the **Login to your Account** button



9. You will be presented with the main OSC Website (response.epa.gov)



10. In the browser address bar, enter **viper.ert.org** to access Deployment Manager.

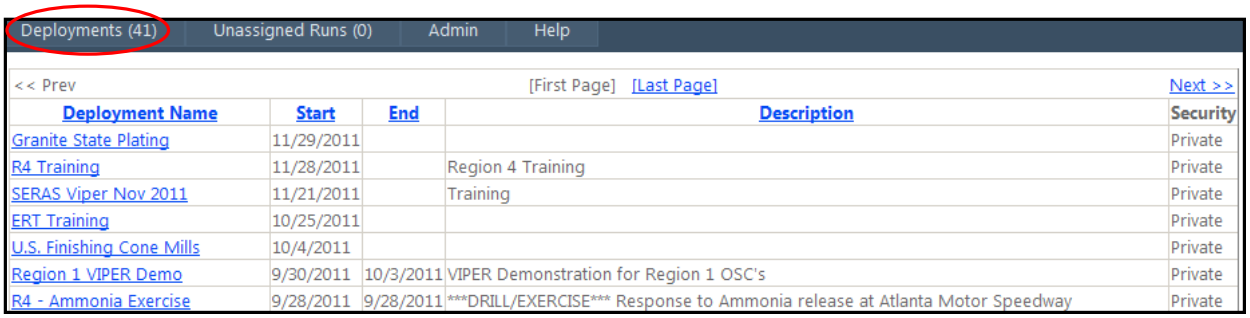


NOTE: If you do not see the deployments you expect, make sure you have been added as a contact with rights to view **'Private'** content on the response.epa.gov website that has been associated with the deployment. For additional information, please contact ERT Software Support at 1-800-999-6990 or email to ertsupport@epa.gov.

Section 2 - Viewing Deployments, Runs and Instruments

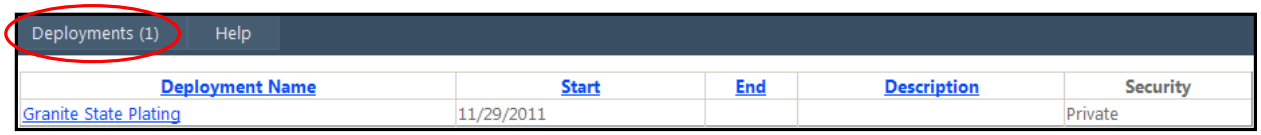
View Deployments

After logging in to Deployment Manager (See section 1 for login details) all deployments to which you have access will be listed in Deployment Manager



Deployment Name	Start	End	Description	Security
Granite State Plating	11/29/2011			Private
R4 Training	11/28/2011		Region 4 Training	Private
SERAS Viper Nov 2011	11/21/2011		Training	Private
ERT Training	10/25/2011			Private
U.S. Finishing Cone Mills	10/4/2011			Private
Region 1 VIPER Demo	9/30/2011	10/3/2011	VIPER Demonstration for Region 1 OSC's	Private
R4 - Ammonia Exercise	9/28/2011	9/28/2011	***DRILL/EXERCISE*** Response to Ammonia release at Atlanta Motor Speedway	Private

Example 1: An example of access to several Deployments



Deployment Name	Start	End	Description	Security
Granite State Plating	11/29/2011			Private

Example 2: An example of access to a single deployment.

1. Select a Deployment by clicking on the **Deployment Name**.

Deployment Name	Start	End	Description	Security
Walton & Lonsbury	7/6/2011		Particulate air monitoring with DataRams at Walton and Lonsbury site in Attleboro, MA.	Private
U.S. Finishing Cone Mills	10/4/2011			Private
Training - Raleigh, NC	7/26/2011	7/26/2011	VIPER training in Raleigh, NC	Private
StJohnAir	12/10/2010	9/7/2011	Monitoring air for contaminants which may affect human health.	Private
St. Croix - System Test	5/18/2011	5/18/2011	System test runs performed on-site prior to deployment.	Private
St Croix Test Run	5/16/2011	5/16/2011		Private
SERAS Viper Nov 2011	11/21/2011		Training	Private
SERAS Air Team Training	6/2/2011	6/2/2011	SERAS Air Team Training	Private
Region 2 Training	8/11/2011	8/11/2011	Region 2 training demo for 8/11/11	Private

Deployment Overview Page

After selecting a deployment, you are presented with the deployment overview page. This page will display all instruments in active Runs assigned to that deployment as well as a list of all prior Runs that have been stopped. The Deployment Overview page is refreshed every 90 seconds. A Run is a collection of instruments & sensor data from a particular source (Survey Controller). Several different Runs can be assigned to the same Deployment. For example, on a large deployment, the CST may have active RAE instrument data that they are sharing with EPA via their instance of Survey Controller, the State may be acquiring data and sharing it via their instance of Survey Controller, and EPA may use multiple Survey Controllers for purpose of instrument configuration, location, etc. All of these instruments will be displayed on the Deployment Overview page.

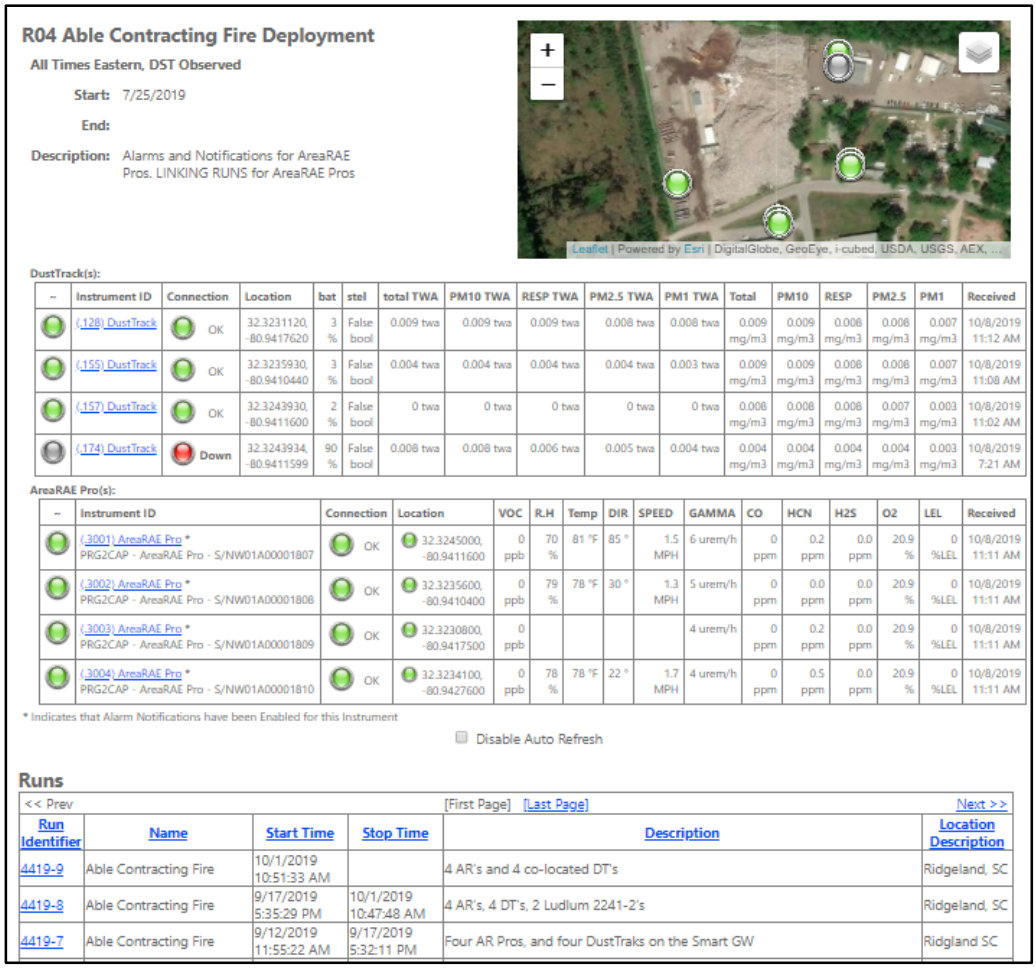
The Deployment Overview Page contains three main parts.

1. The top portion

- Shows the Deployment name, start date and a brief description (if provided)
- An Esri Leaflet Map showing colored markers of instrument locations. Clicking on a marker will display the instrument details as well as contain a link to the individual instrument page. The individual instrument page is discussed later in this guide.

2. The center portion of the overview page is organized in tables showing active Runs and includes:
   - Instruments grouped by Type
   - Instrument IDs
   - Connection Status
   - GPS coordinates
   - Instrument-specific sensors & readings
   - Current reading date and time

   - The lower portion of the page lists current and prior Runs assigned to the Deployment



R04 Able Contracting Fire Deployment

All Times Eastern, DST Observed

Start: 7/25/2019

End:

Description: Alarms and Notifications for AreaRAE Pros. LINKING RUNS for AreaRAE Pros

DustTrack(s):

–	Instrument ID	Connection	Location	bat	stel	total TWA	PM10 TWA	RESP TWA	PM2.5 TWA	PM1 TWA	Total	PM10	RESP	PM2.5	PM1	Received
	(128) DustTrack	OK	32.3231120, -80.9417620	3 %	False bool	0.009 twa	0.009 twa	0.009 twa	0.008 twa	0.008 twa	0.009 mg/m3	0.009 mg/m3	0.008 mg/m3	0.008 mg/m3	0.007 mg/m3	10/8/2019 11:12 AM
	(155) DustTrack	OK	32.3235930, -80.9410440	3 %	False bool	0.004 twa	0.004 twa	0.004 twa	0.004 twa	0.003 twa	0.009 mg/m3	0.009 mg/m3	0.008 mg/m3	0.008 mg/m3	0.007 mg/m3	10/8/2019 11:08 AM
	(157) DustTrack	OK	32.3243930, -80.9411600	2 %	False bool	0 twa	0 twa	0 twa	0 twa	0 twa	0.008 mg/m3	0.008 mg/m3	0.008 mg/m3	0.007 mg/m3	0.003 mg/m3	10/8/2019 11:02 AM
	(174) DustTrack	Down	32.3243934, -80.9411599	90 %	False bool	0.008 twa	0.008 twa	0.006 twa	0.005 twa	0.004 twa	0.004 mg/m3	0.004 mg/m3	0.004 mg/m3	0.004 mg/m3	0.003 mg/m3	10/8/2019 7:21 AM

AreaRAE Pro(s):

–	Instrument ID	Connection	Location	VOC	R.H	Temp	DIR	SPEED	GAMMA	CO	HCN	H2S	O2	LEL	Received
	(3001) AreaRAE Pro * PRG2CAP - AreaRAE Pro - S/NW01A00001807	OK	32.3245000, -80.9411600	0 ppb	70 %	81 °F	85 °	1.5 MPH	6 urem/h	0 ppm	0.2 ppm	0.0 ppm	20.9 %	0 %LEL	10/8/2019 11:11 AM
	(3002) AreaRAE Pro * PRG2CAP - AreaRAE Pro - S/NW01A00001808	OK	32.3235600, -80.9410400	0 ppb	79 %	78 °F	30 °	1.3 MPH	5 urem/h	0 ppm	0.0 ppm	0.0 ppm	20.9 %	0 %LEL	10/8/2019 11:11 AM
	(3003) AreaRAE Pro * PRG2CAP - AreaRAE Pro - S/NW01A00001809	OK	32.3230800, -80.9417500	0 ppb					4 urem/h	0 ppm	0.2 ppm	0.0 ppm	20.9 %	0 %LEL	10/8/2019 11:11 AM
	(3004) AreaRAE Pro * PRG2CAP - AreaRAE Pro - S/NW01A00001810	OK	32.3234100, -80.9427600	0 ppb	78 %	78 °F	22 °	1.7 MPH	4 urem/h	0 ppm	0.5 ppm	0.0 ppm	20.9 %	0 %LEL	10/8/2019 11:11 AM

* Indicates that Alarm Notifications have been Enabled for this Instrument

Disable Auto Refresh

Runs

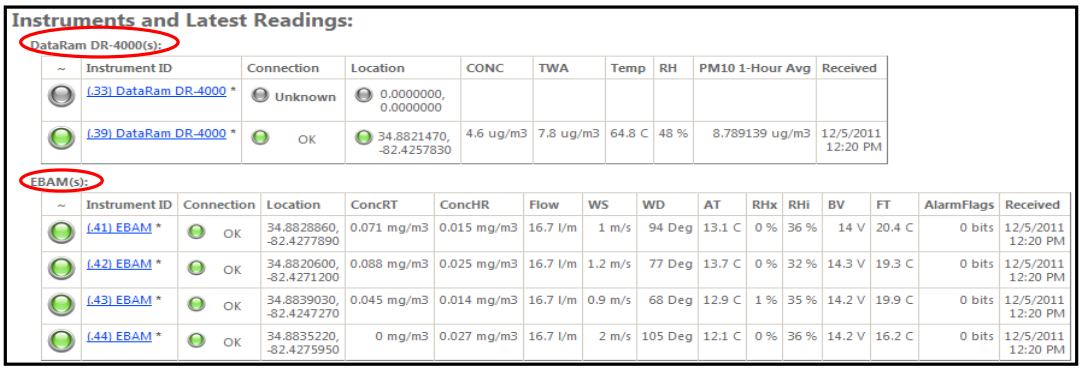
<< Prev [First Page] [Last Page] Next > >

Run Identifier	Name	Start Time	Stop Time	Description	Location Description
4419-9	Able Contracting Fire	10/1/2019 10:51:33 AM		4 AR's and 4 co-located DT's	Ridgeland, SC
4419-8	Able Contracting Fire	9/17/2019 5:35:29 PM	10/1/2019 10:47:48 AM	4 AR's, 4 DT's, 2 Ludlum 2241-2's	Ridgeland, SC
4419-7	Able Contracting Fire	9/12/2019 11:55:22 AM	9/17/2019 5:32:11 PM	Four AR Pros, and four DustTraks on the Smart GW	Ridgland SC

Interpreting the Instrument Display

1. **Instrument Grouping**:

   By default, Deployment Manager will group and display like-named instruments together. If the Run is configured as a 'Cluster', Deployment Manager will group and display instruments instead by their Cluster Name. Clusters are configured in Survey Controller – before the data is received in Deployment Manager.



Instruments and Latest Readings:

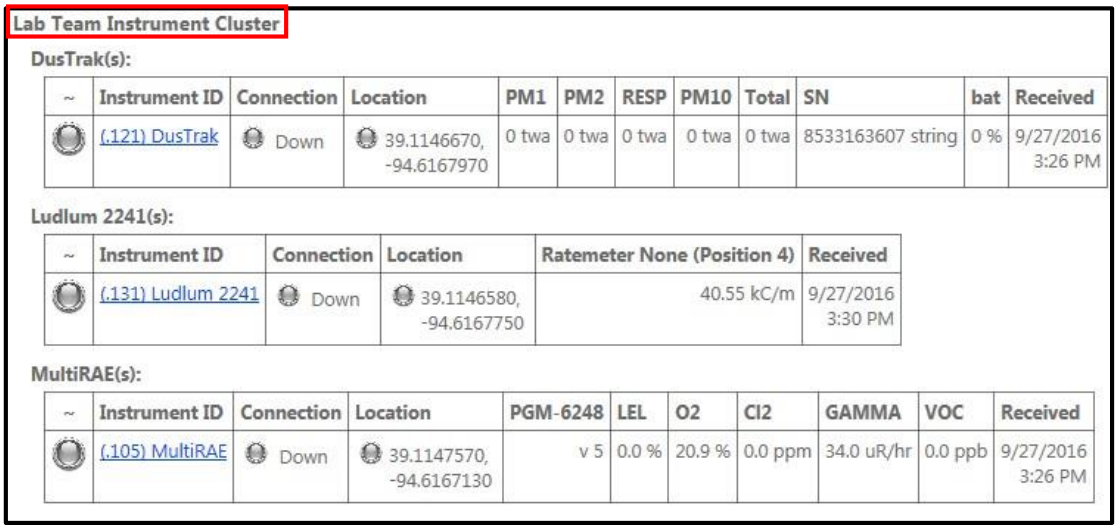
DataRam DR-4000(s):

~	Instrument ID	Connection	Location	CONC	TWA	Temp	RH	PM10 1-Hour Avg	Received
	(.33) DataRam DR-4000 *	Unknown	0.0000000, 0.0000000						
	(.39) DataRam DR-4000 *	OK	34.8821470, -82.4257830	4.6 ug/m3	7.8 ug/m3	64.8 C	48 %	8.789139 ug/m3	12/5/2011 12:20 PM

EBAM(s):

~	Instrument ID	Connection	Location	ConcRT	ConcHR	Flow	WS	WD	AT	RHx	RHi	BV	FT	AlarmFlags	Received
	(.41) EBAM *	OK	34.8828860, -82.4277890	0.071 mg/m3	0.015 mg/m3	16.7 l/m	1 m/s	94 Deg	13.1 C	0 %	36 %	14 V	20.4 C	0 bits	12/5/2011 12:20 PM
	(.42) EBAM *	OK	34.8820600, -82.4271200	0.088 mg/m3	0.025 mg/m3	16.7 l/m	1.2 m/s	77 Deg	13.7 C	0 %	32 %	14.3 V	19.3 C	0 bits	12/5/2011 12:20 PM
	(.43) EBAM *	OK	34.8839030, -82.4247270	0.045 mg/m3	0.014 mg/m3	16.7 l/m	0.9 m/s	68 Deg	12.9 C	1 %	35 %	14.2 V	19.9 C	0 bits	12/5/2011 12:20 PM
	(.44) EBAM *	OK	34.8835220, -82.4275950	0 mg/m3	0.027 mg/m3	16.7 l/m	2 m/s	105 Deg	12.1 C	0 %	36 %	14.2 V	16.2 C	0 bits	12/5/2011 12:20 PM

Example: Instruments associated with a deployment grouped by instrument type



Lab Team Instrument Cluster

DusTrak(s):

~	Instrument ID	Connection	Location	PM1	PM2	RESP	PM10	Total	SN	bat	Received
	(.121) DusTrak	Down	39.1146670, -94.6167970	0 twa	0 twa	0 twa	0 twa	0 twa	8533163607 string	0 %	9/27/2016 3:26 PM

Ludlum 2241(s):

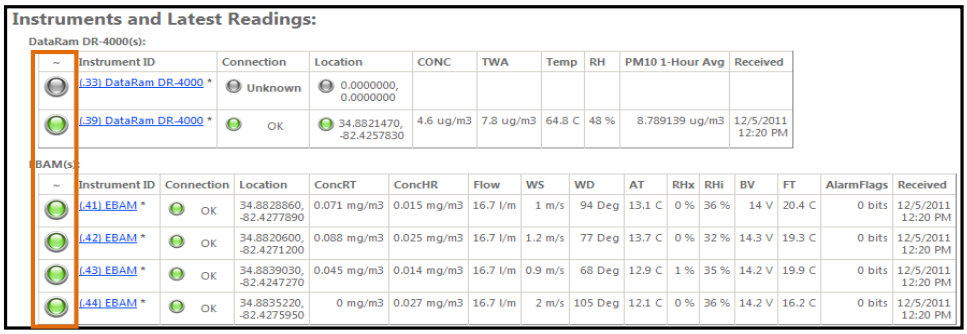
~	Instrument ID	Connection	Location	Ratemeter None (Position 4)	Received
	(.131) Ludlum 2241	Down	39.1146580, -94.6167750	40.55 kC/m	9/27/2016 3:30 PM

MultiRAE(s):

~	Instrument ID	Connection	Location	PGM-6248	LEL	O2	Cl2	GAMMA	VOC	Received
	(.105) MultiRAE	Down	39.1147570, -94.6167130	v 5	0.0 %	20.9 %	0.0 ppm	34.0 uR/hr	0.0 ppb	9/27/2016 3:26 PM

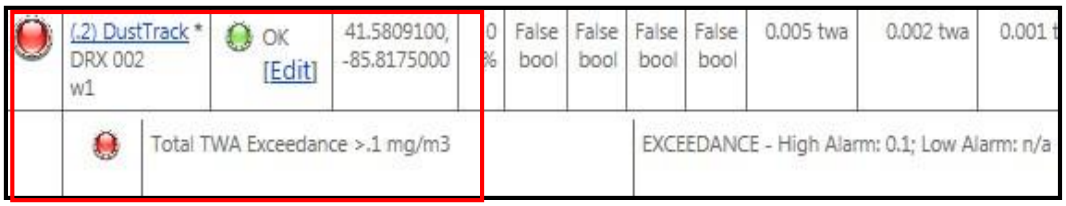
Example: Instruments associated with a deployment grouped by Cluster.

2. Instrument Status Lights:



a. The colored status indicator light in the Instrument **Main column *(~)*** indicates the following:

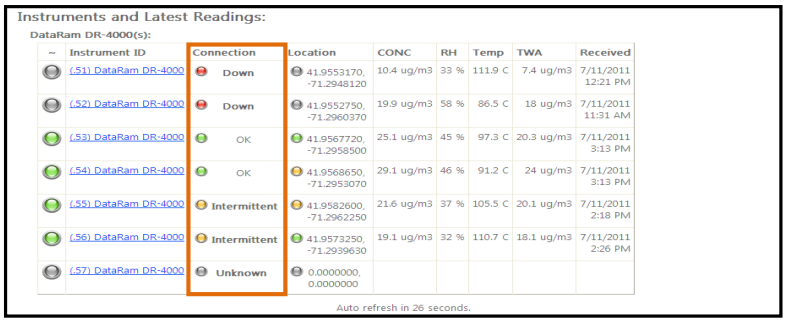
- **Green**: The instrument is active in Deployment Manager and is not in alarm state.
- **Yellow:** A Warning Alarm has been triggered. Once active alarms expire, the lights will turn back to green.
- **Red:** An Exceedance Alarm has been triggered. Once active alarms expire, the lights will turn back to green.
- **Grey:** Deployment Manager perceives the instrument to be inactive (i.e., no data or connection "Down").



Example: Exceedance Alarm has been triggered

Note: When viewing instruments in Deployment Manager, an InstrumentID followed by an asterisk (*) indicates that Alarm *Notifications* have been enabled for this Instrument.

b. The colored status indicator light in the ***Connection*** column indicates the following:



- **Green** indicates deployment manager is receiving readings. By default, a green connection status indicates that a reading has been received within the last 45 minutes. This time period is configurable.
- **Yellow** indicates Intermittent connectivity. By default, a yellow connection status indicates that the latest reading has been received between 45 and 90 minutes ago. This time period is configurable.

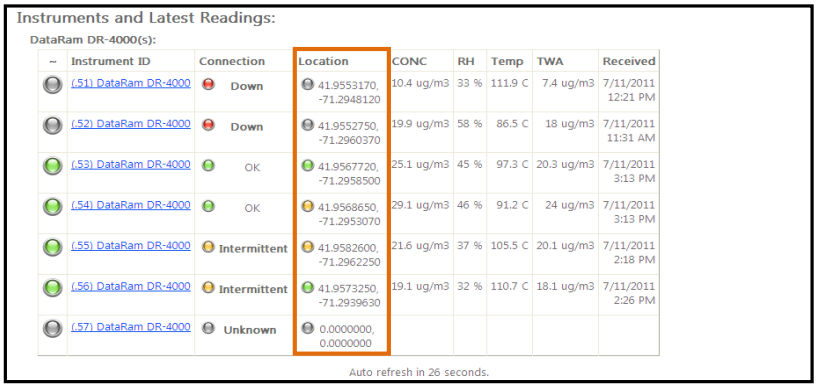
- **Red** indicates the connection is Down. By default, a red connection status indicates that the latest reading is more than 90 minutes old. This time period is configurable. When the connection status light is red, the main light for the instrument (~) will turn grey.

  Grey: When Deployment Manager first sees a new run, all of the Instruments will have grey lights and a connection status of "Unknown" by default. Once Deployment Manager receives at least one reading for an instrument, its lights will come on and its connection status will change to "OK/green", "Intermittent/yellow", or "Down/red. NOTE: When a run is stopped, the instruments will not be displayed on the Overview page. However, when looking at instruments at the Stopped Run page, all lights will be grey (i.e., off).

  NOTE: An instrument can be down (grey ~ column), but still have a red connection light (as shown above). This is an attempt to make it clear that the instrument is inactive but in an alarm state. Alarm lights will stay lit (red) because alarms can't expire while the connection is down. Deployment Manager must receive a non-alarm reading with a timestamp at least 30 minutes later than the most recent alarm reading.

c. An instrument will have a light in the ***Location*** column only if the instrument is configured as "Mobile" (Mobile indicates that coordinates for each reading are retrieved from the LINC GPS receiver or other source as opposed to having fixed coordinates manually entered).

   The Location column will have the following colored status indicators:

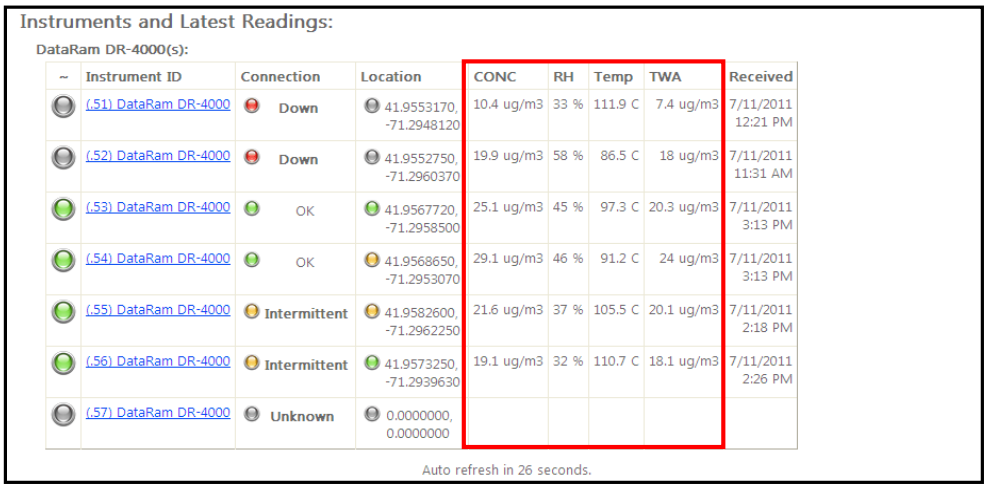


- **Green** indicates the MeterApp is receiving updated coordinates from the LINC or GPS source.
- **Yellow** indicates that the MeterApp stopped receiving updated coordinates from the LINC or GPS source. The coordinates are considered stale and the last good coordinate received will be used for all readings until an updated coordinate is received. Stale coordinates can be caused by either a poor GPS signal at the LINC or GPS source, or a connectivity problem between the MeterApp and LINC.
- **Grey** indicates that the instrument is inactive (i.e., when the main light is also grey).

3. Sensor Readings:

The columns listed after the location reflect the Sensors for each instrument and their current readings.

If any Deployment Manager created Rolling Time Weighted Avereage (TWA), or Conversions have been created, those will also be displayed as instrument sensors.



Instruments and Latest Readings:

DataRam DR-4000(s):

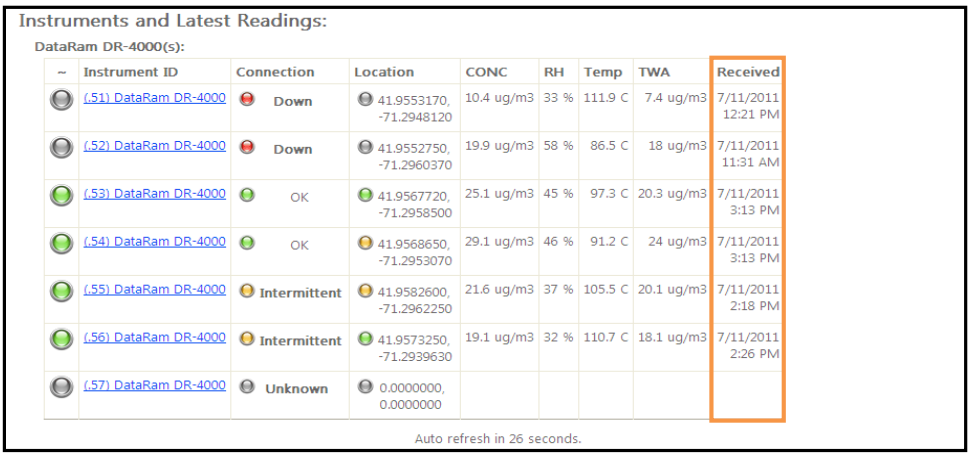
~	Instrument ID	Connection	Location	CONC	RH	Temp	TWA	Received
	(.51) DataRam DR-4000	Down	41.9553170, -71.2948120	10.4 ug/m3	33 %	111.9 C	7.4 ug/m3	7/11/2011 12:21 PM
	(.52) DataRam DR-4000	Down	41.9552750, -71.2960370	19.9 ug/m3	58 %	86.5 C	18 ug/m3	7/11/2011 11:31 AM
	(.53) DataRam DR-4000	OK	41.9567720, -71.2958500	25.1 ug/m3	45 %	97.3 C	20.3 ug/m3	7/11/2011 3:13 PM
	(.54) DataRam DR-4000	OK	41.9568650, -71.2953070	29.1 ug/m3	46 %	91.2 C	24 ug/m3	7/11/2011 3:13 PM
	(.55) DataRam DR-4000	Intermittent	41.9582600, -71.2962250	21.6 ug/m3	37 %	105.5 C	20.1 ug/m3	7/11/2011 2:18 PM
	(.56) DataRam DR-4000	Intermittent	41.9573250, -71.2939630	19.1 ug/m3	32 %	110.7 C	18.1 ug/m3	7/11/2011 2:26 PM
	(.57) DataRam DR-4000	Unknown	0.0000000, 0.0000000					

Auto refresh in 26 seconds.

4. The Received column

shows the last time data was received by Deployment Manager for each instrument.

As stated earlier, an instrument will appear Green for a default period of 45 minutes if it has not received a reading. After 45 minutes of not receiving a reading, the instrument will show as Intermittent.



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DataRam DR-4000(s):

~	Instrument ID	Connection	Location	CONC	RH	Temp	TWA	Received
	(.51) DataRam DR-4000	Down	41.9553170, -71.2948120	10.4 ug/m3	33 %	111.9 C	7.4 ug/m3	7/11/2011 12:21 PM
	(.52) DataRam DR-4000	Down	41.9552750, -71.2960370	19.9 ug/m3	58 %	86.5 C	18 ug/m3	7/11/2011 11:31 AM
	(.53) DataRam DR-4000	OK	41.9567720, -71.2958500	25.1 ug/m3	45 %	97.3 C	20.3 ug/m3	7/11/2011 3:13 PM
	(.54) DataRam DR-4000	OK	41.9568650, -71.2953070	29.1 ug/m3	46 %	91.2 C	24 ug/m3	7/11/2011 3:13 PM
	(.55) DataRam DR-4000	Intermittent	41.9582600, -71.2962250	21.6 ug/m3	37 %	105.5 C	20.1 ug/m3	7/11/2011 2:18 PM
	(.56) DataRam DR-4000	Intermittent	41.9573250, -71.2939630	19.1 ug/m3	32 %	110.7 C	18.1 ug/m3	7/11/2011 2:26 PM
	(.57) DataRam DR-4000	Unknown	0.0000000, 0.0000000					

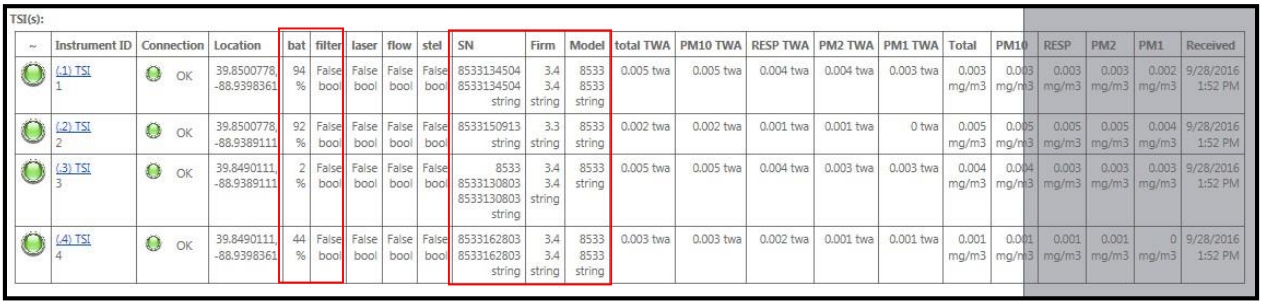
Auto refresh in 26 seconds.

Customizing the Deployment Overview Page

1. Limiting Sensors from View

Instrument sensors can be displayed or not displayed in Deployment Manager. Limiting the view of sensors displayed can help focus attention on the sensors of concern and present a cleaner organization of the deployment manager overview page. The example below shows extraneous instrument sensors that can be removed from view – such as the instrument serial number, firmware version, etc. In the second example, those sensors have been removed from view and the sensors of concern are more clearly displayed.

NOTE: Modifying which Sensor(s) are displayed is configured by ERT Software Support. Please contact ERT Software Support at 1-800-999-6990 or via email at ertsupport@epa.gov.



TSI(s):

~	Instrument ID	Connection	Location	bat	filter	laser	flow	stel	SN	Firm	Model	total TWA	PM10 TWA	RESP TWA	PM2 TWA	PM1 TWA	Total	PM10	RESP	PM2	PM1	Received
	(1) TSI 1	OK	39.8500778, -88.9398361	94 %	False bool	False bool	False bool	False bool	8533134504 8533134504 string	3.4 3.4 string	8533 8533 string	0.005 twa	0.005 twa	0.004 twa	0.004 twa	0.003 twa	0.003 mg/m3	0.003 mg/m3	0.003 mg/m3	0.003 mg/m3	0.002 mg/m3	9/28/2016 1:52 PM
	(2) TSI 2	OK	39.8500778, -88.9389111	92 %	False bool	False bool	False bool	False bool	8533150913 string	3.3 string	8533 string	0.002 twa	0.002 twa	0.001 twa	0.001 twa	0 twa	0.005 mg/m3	0.005 mg/m3	0.005 mg/m3	0.005 mg/m3	0.004 mg/m3	9/28/2016 1:52 PM
	(3) TSI 3	OK	39.8490111, -88.9389111	2 %	False bool	False bool	False bool	False bool	8533 8533130803 8533130803 string	3.4 3.4 string	8533 string	0.005 twa	0.005 twa	0.004 twa	0.003 twa	0.003 twa	0.004 mg/m3	0.004 mg/m3	0.003 mg/m3	0.003 mg/m3	0.003 mg/m3	9/28/2016 1:52 PM
	(4) TSI 4	OK	39.8490111, -88.9398361	44 %	False bool	False bool	False bool	False bool	8533162803 8533162803 string	3.4 3.4 string	8533 8533 string	0.003 twa	0.003 twa	0.002 twa	0.001 twa	0.001 twa	0.001 mg/m3	0.001 mg/m3	0.001 mg/m3	0.001 mg/m3	0 mg/m3	9/28/2016 1:52 PM

Example of TSI/DustTrak displaying all of its sensors

TSI(s):

~	Instrument ID	Connection	Location	filter	laser	flow	stel	total TWA	PM10 TWA	RESP TWA	PM2 TWA	PM1 TWA	Total	PM10	RESP	PM2	PM1	Received
	(1) TSI 1	OK	39.8500778, -88.9398361	False bool	False bool	False bool	False bool	0.004 twa	0.004 twa	0.003 twa	23136 twa	0 twa	0.003 mg/m3	0.003 mg/m3	0.003 mg/m3	0 mg/m3	0 mg/m3	9/28/2016 1:57 PM
	(2) TSI 2	OK	39.8500778, -88.9389111		False bool	False bool	False bool	0.002 twa	0.002 twa	0.001 twa	0.001 twa	0.001 twa	0.006 mg/m3	0.006 mg/m3	0.006 mg/m3	0.006 mg/m3	0.005 mg/m3	9/28/2016 1:57 PM
	(3) TSI 3	OK	39.8490111, -88.9389111		False bool	False bool	False bool	0.006 twa	0.005 twa	0.004 twa	0.003 twa	0.003 twa	0.004 mg/m3	0.004 mg/m3	0.003 mg/m3	0.003 mg/m3	0.003 mg/m3	9/28/2016 1:57 PM
	(4) TSI 4	OK	39.8490111, -88.9398361		False bool	False bool	False bool	0.003 twa	0.003 twa	0.002 twa	0.001 twa	0.001 twa	0.011 mg/m3	0.011 mg/m3	0.002 mg/m3	0.002 mg/m3	0.002 mg/m3	9/28/2016 1:57 PM

Example of TSI/DustTrak with some sensor removed from visibility

Selecting an Individual Instrument

From the Deployment Overview page, there are two ways to select an individual instrument. Selecting an individual instrument allows you to create a custom graph of that instrument's readings, export the readings to a spreadsheet (.csv) or export the graph as an image file. For additional information and specific instructions on graphing, please see Section 3 of this guide.

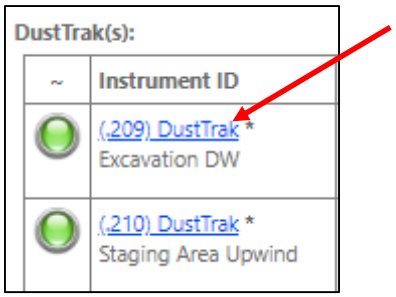
Option 1 - Selecting an individual instrument from a marker on the map

- Click any marker on the map and the instrument ID will be displayed
- Click on the instrument ID and the instrument-specific page will be displayed.

  On the instrument-specific page, data can be graphed and exported**. See Section 3 for details on graphing from the instrument-specific page.**

Option 2 - Selecting an individual instrument from the instrument table

- Click on an instrument ID (blue text) to select an individual instrument's page.



Individual Runs

The lower portion of the Deployment Overview page lists all of the Runs assigned to that deployment. The number of Runs assigned to a Deployment is determined by a few factors. One factor is the number of Survey Controllers sending data to a Deployment. Also, each time a Run for that deployment is started and stopped, a new Run entry will appear in the table. In the example below, the **Run Identifier** column shows that there are multiple Survey Controllers sending data to the Deployment (notice the different ID numbers 4523, 4530, 4592, 4508). A blank **Stop Time** field indicates that a Run is active (or has not been stopped).

Runs

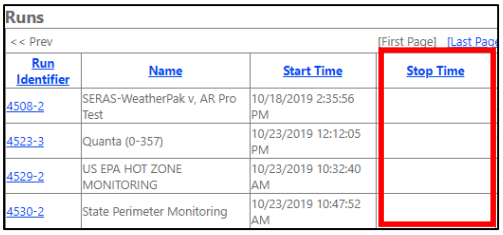
<< Prev [First Page] [Last Page]

Run Identifier	Name	Start Time	Stop Time	Description	Location Description
4523-3	Quanta (0-357)	10/23/2019 12:12:05 PM		Weather Data Collection	10/23/19
4530-2	State Perimeter Monitoring	10/23/2019 10:47:52 AM		Particulate Monitoring with TSI DustTraks	
4529-2	US EPA HOT ZONE MONITORING	10/23/2019 10:32:40 AM		2 MultiRAE Pros in the Hot Zone	
4523-2	Weather Data	10/22/2019 11:47:59 AM	10/22/2019 2:11:24 PM	Quanta	NJ
4508-2	SERAS-WeatherPak v, AR Pro Test	10/18/2019 2:35:56 PM		AR Pro & Weather Pak	Edison, NJ
4226-6	SERAS-WeatherPak Test	10/18/2019 10:13:23 AM	10/18/2019 11:12:10 AM	WeatherPak	Edison, NJ

Navigating through the list of Runs

1. If more than one page of Runs exists for a Deployment, use the **<<prev**, **>>next**, **[First Page]**, and **[Last Page]** options at the top or bottom of the list of Runs to move through the pages Runs.

2. The list of Runs can be **sorted** by clicking on a column heading. The first time a column heading is selected, the sort order ascending. The second time a column heading is selected, the sort order is descending. The screenshot to the right shows the Stop Time column sorted to show all of the active runs at the top.



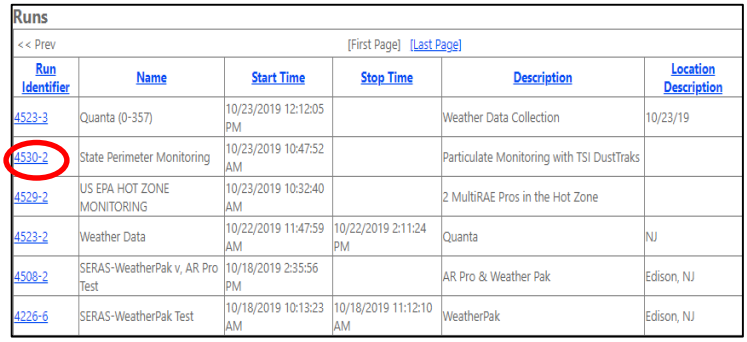
Runs

<< Prev [First Page] [Last Page]

Run Identifier	Name	Start Time	Stop Time
4508-2	SERAS-WeatherPak v, AR Pro Test	10/18/2019 2:35:56 PM	
4523-3	Quanta (0-357)	10/23/2019 12:12:05 PM	
4529-2	US EPA HOT ZONE MONITORING	10/23/2019 10:32:40 AM	
4530-2	State Perimeter Monitoring	10/23/2019 10:47:52 AM	

Selecting an Individual Run

- Click on a specific Run Identifier to select a particular run and display the individual Run page. Both active and stopped Runs can be selected.

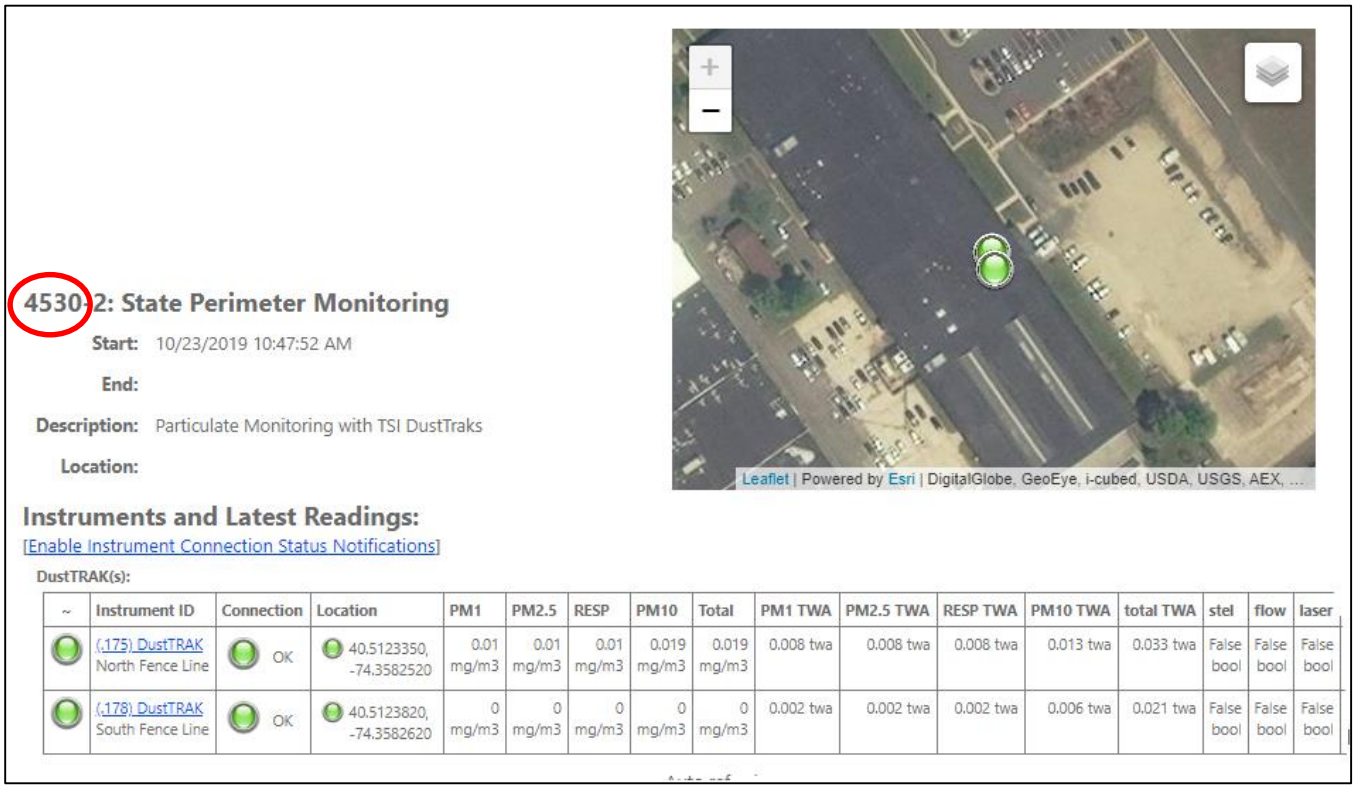


Runs

<< Prev [First Page] [Last Page]

Run Identifier	Name	Start Time	Stop Time	Description	Location Description
4523-3	Quanta (0-357)	10/23/2019 12:12:05 PM		Weather Data Collection	10/23/19
4530-2	State Perimeter Monitoring	10/23/2019 10:47:52 AM		Particulate Monitoring with TSI DustTraks	
4529-2	US EPA HOT ZONE MONITORING	10/23/2019 10:32:40 AM		2 MultiRAE Pros in the Hot Zone	
4523-2	Weather Data	10/22/2019 11:47:59 AM	10/22/2019 2:11:24 PM	Quanta	NJ
4508-2	SERAS-WeatherPak v, AR Pro Test	10/18/2019 2:35:56 PM		AR Pro & Weather Pak	Edison, NJ
4226-6	SERAS-WeatherPak Test	10/18/2019 10:13:23 AM	10/18/2019 11:12:10 AM	WeatherPak	Edison, NJ

- The Run-Specific page displays only the instruments contained in that Run from that specific Survey Controller. Notice that the Survey Controller number and Run description are displayed on the Run-specific page.



4530-2: State Perimeter Monitoring

Start: 10/23/2019 10:47:52 AM

End:

Description: Particulate Monitoring with TSI DustTraks

Location:

Instruments and Latest Readings:

[Enable Instrument Connection Status Notifications]

DustTRAK(s):

~	Instrument ID	Connection	Location	PM1	PM2.5	RESP	PM10	Total	PM1 TWA	PM2.5 TWA	RESP TWA	PM10 TWA	total TWA	stel	flow	laser
	(175) DustTRAK North Fence Line	OK	40.5123350, -74.3582520	0.01 mg/m3	0.01 mg/m3	0.01 mg/m3	0.019 mg/m3	0.019 mg/m3	0.008 twa	0.008 twa	0.008 twa	0.013 twa	0.033 twa	False bool	False bool	False bool
	(178) DustTRAK South Fence Line	OK	40.5123820, -74.3582620	0 mg/m3	0 mg/m3	0 mg/m3	0 mg/m3	0 mg/m3	0.002 twa	0.002 twa	0.002 twa	0.006 twa	0.021 twa	False bool	False bool	False bool

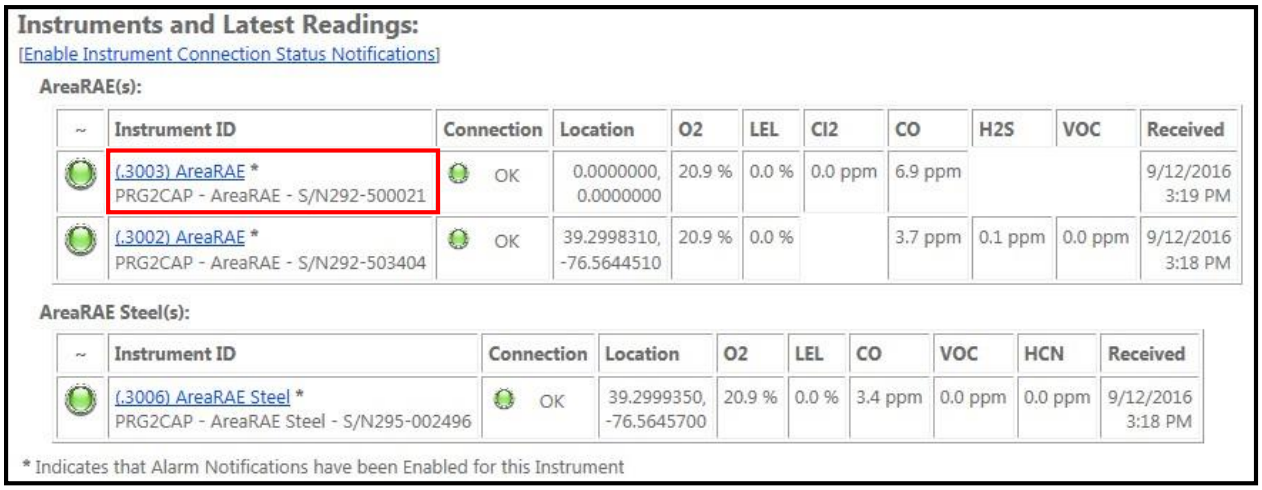
SECTION 3 - SENSOR DATA GRAPHS & WIND ROSE

Generate Sensor Data Graphs

Instrument-specific graphs can be generated in various ways. After a graph is generated, the data for that graph can be exported as **.csv** file, which can be opened in MS Excel for further viewing, graphing, sorting, etc. You can also export the Graphs/Chart to an image file (.**png**, **.jpeg**, **.pdf** and **SVG Vector)**.

By default, the graph displays the last two (2) hours of data. Options include modifying the time range and changing which sensors are displayed.

1. To Generate Sensor Data Graphs, click on the specific **Instrument ID** you want to graph.



Instruments and Latest Readings:

[Enable Instrument Connection Status Notifications]

AreaRAE(s):

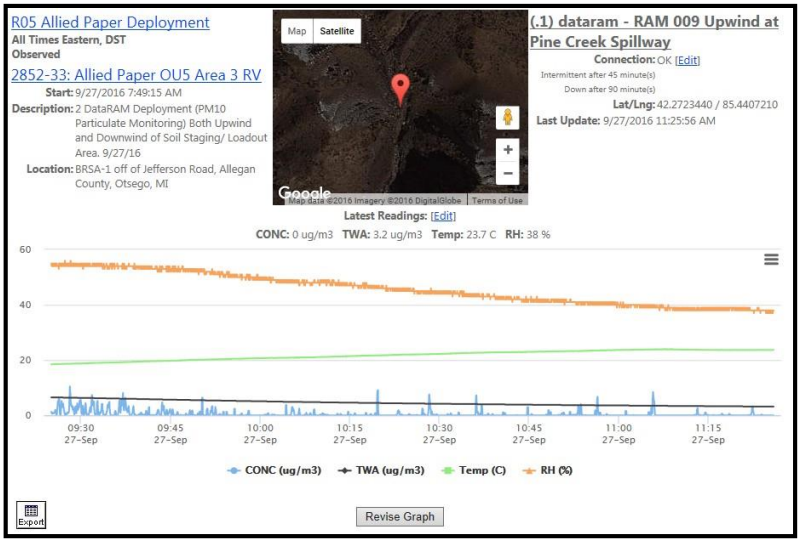
~	Instrument ID	Connection	Location	O2	LEL	CI2	CO	H2S	VOC	Received
	(.3003) AreaRAE * PRG2CAP - AreaRAE - S/N292-500021	OK	0.0000000, 0.0000000	20.9 %	0.0 %	0.0 ppm	6.9 ppm			9/12/2016 3:19 PM
	(.3002) AreaRAE * PRG2CAP - AreaRAE - S/N292-503404	OK	39.2998310, -76.5644510	20.9 %	0.0 %		3.7 ppm	0.1 ppm	0.0 ppm	9/12/2016 3:18 PM

AreaRAE Steel(s):

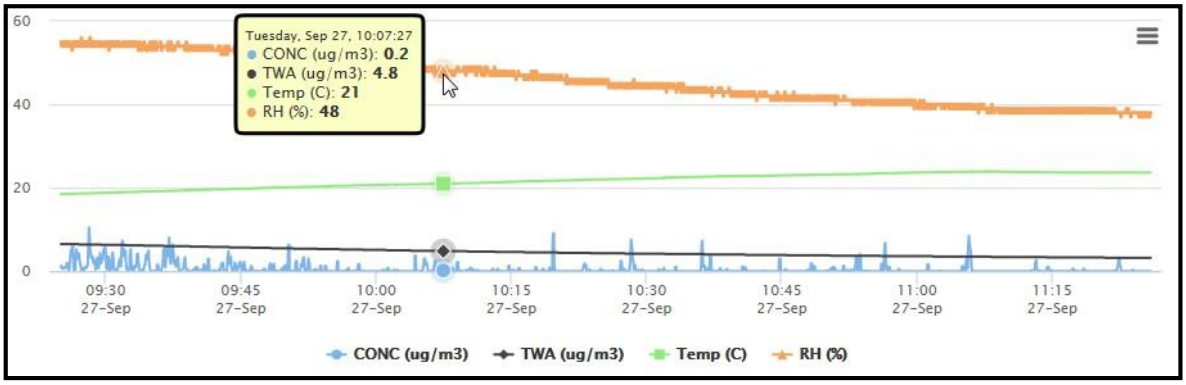
~	Instrument ID	Connection	Location	O2	LEL	CO	VOC	HCN	Received
	(.3006) AreaRAE Steel * PRG2CAP - AreaRAE Steel - S/N295-002496	OK	39.2999350, -76.5645700	20.9 %	0.0 %	3.4 ppm	0.0 ppm	0.0 ppm	9/12/2016 3:18 PM

* Indicates that Alarm Notifications have been Enabled for this Instrument

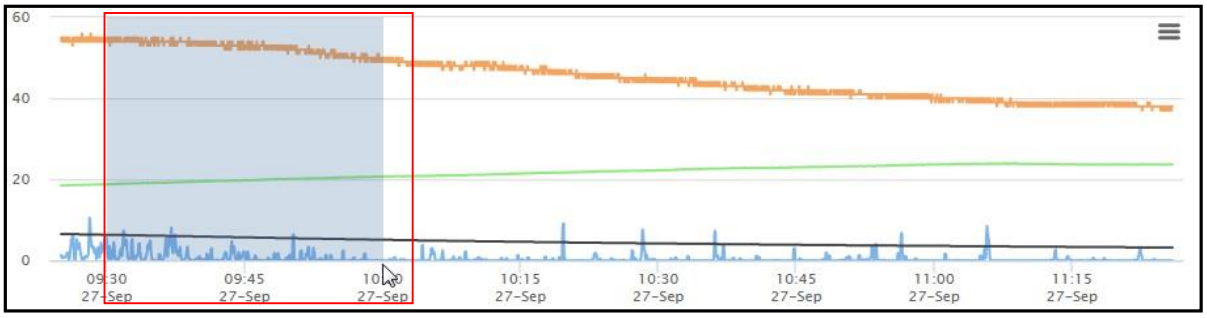
The Instrument Specific view displays the Deployment and Run information in the upper left portion of the screen. A map in the center; and the instrument information (i.e., Linc #, additional location information, Lat/Long and Last Update date and time) are displayed to the right of the map. The Sensor Graph is displayed below and includes the last two (2) hours of readings by default.



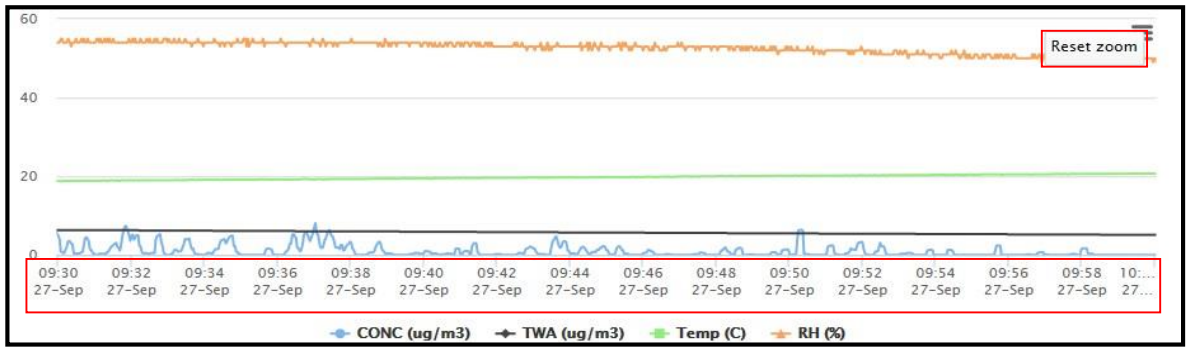
2. Hover over any graphed line to get a summary of the sensor(s) readings at that specific time period.



3. By placing your mouse at a starting time and dragging to an ending time (i.e., between 9:30 and 10:00 am) the graph will zoom to that time period and display the corresponding readings. To return to the full reading, click on Reset zoom.

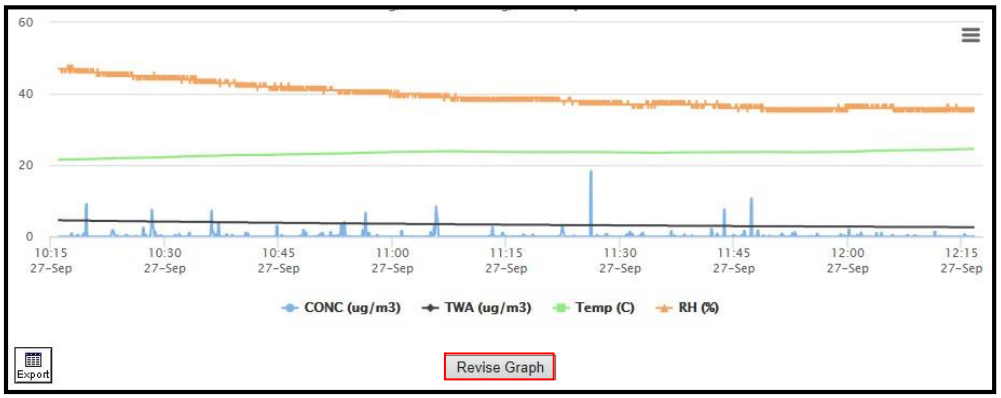


Example: Zoom between 9:30 and 10:00 am

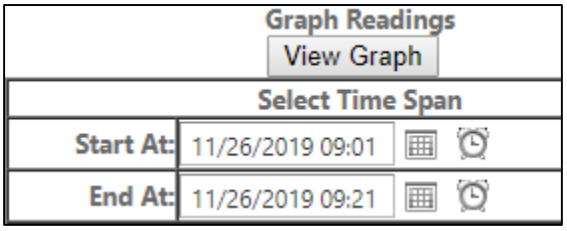


Example: Graph display between 9:30 and 10:00 am

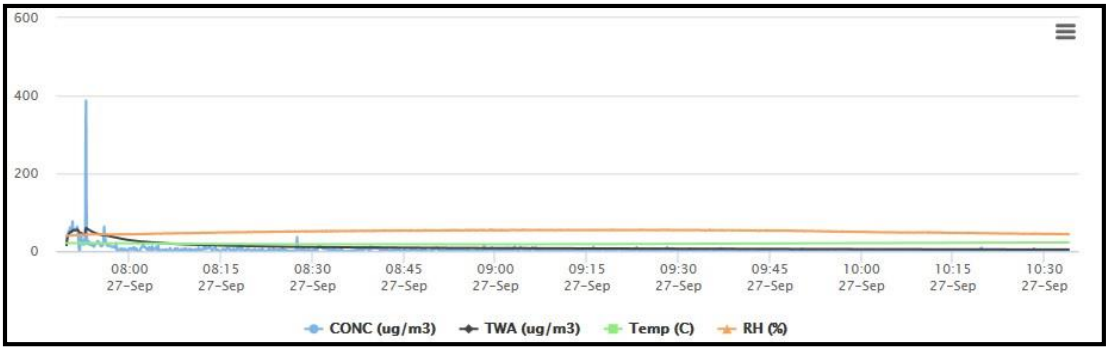
4. To graph data outside of the default two-hour window, click the **Revise Graph** button. NOTE: Unless runs have been linked (linking is covered in section 5), the graph will only display readings for the extent of the selected Run.



5. Modify the **Start At and/or End At date boxes.** Type directly in the Date/Time fields or use the Calendar icon to change a date or the Clock icon to change the time. .



6. Click on either View Graph button to display the new date/time range in the graph

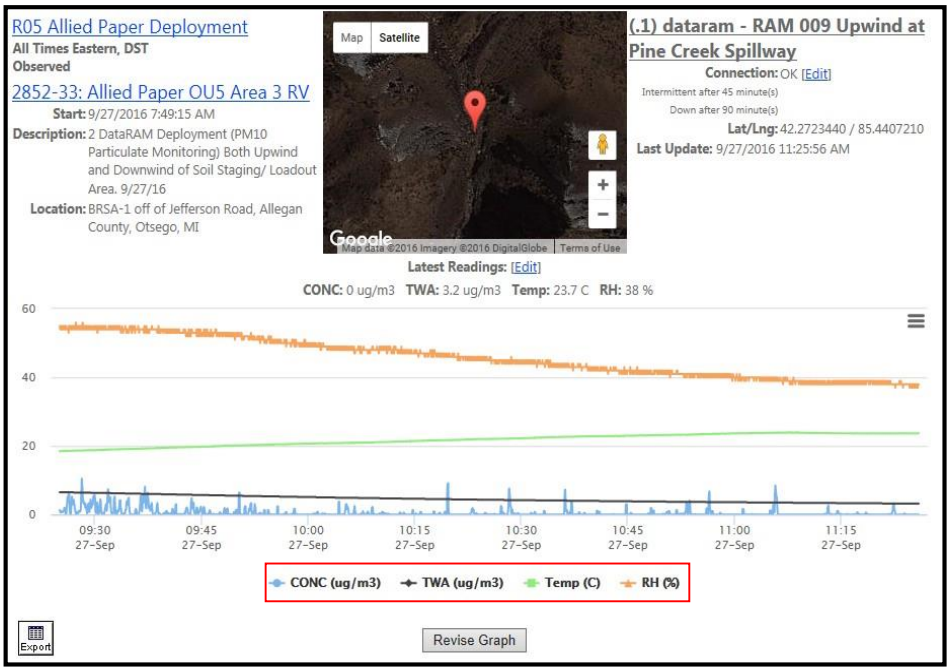


Example: Graph from 7:49 am to 10:00 am

***** TECHNICAL NOTE: See section 5 about linking runs to expand the time period of a graph across runs.

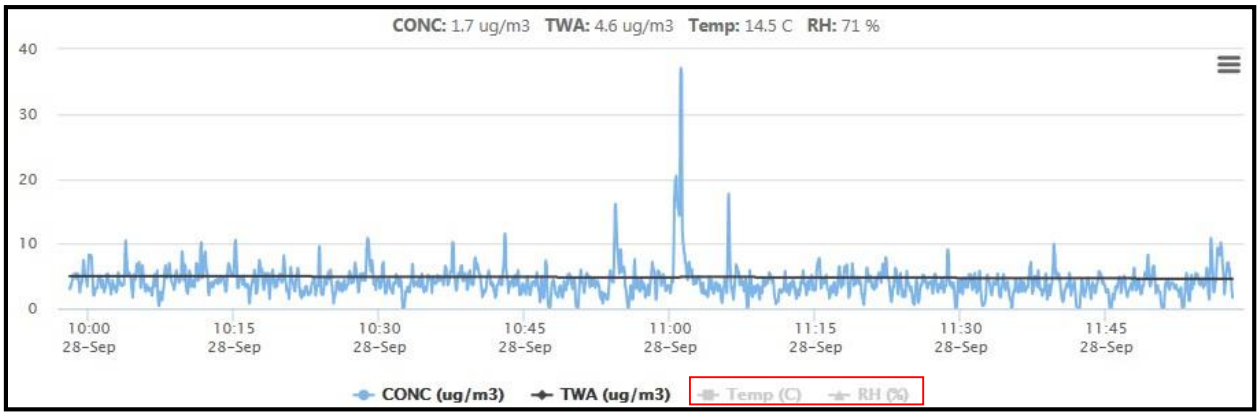
Toggle Sensors On and Off

The sensors displayed at the bottom of the graph can be toggled on an off as needed.

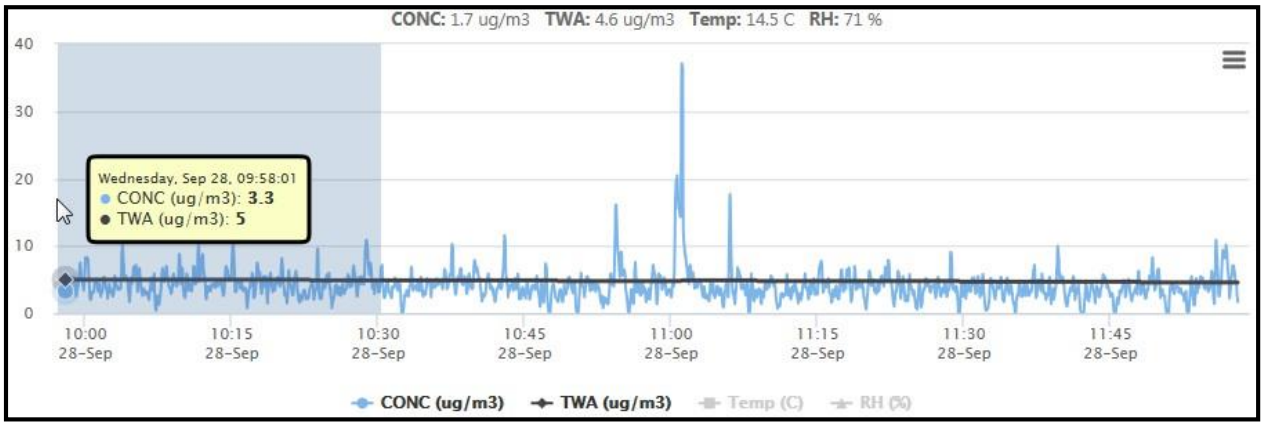


Example: All Sensors Displayed

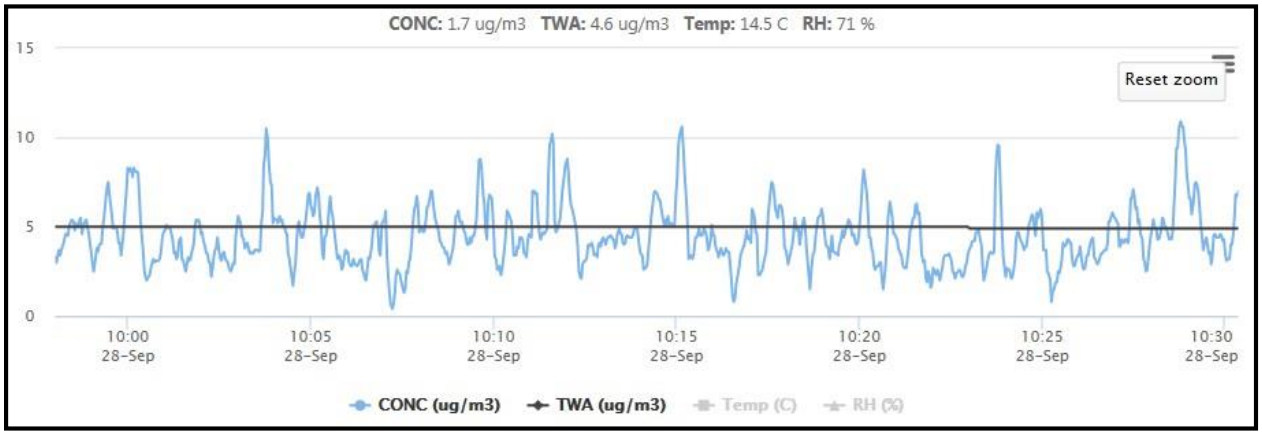
1. To view the graph for a specific sensor(s), you can turn on/off the other sensors. Below the graph, Click on a sensor(s) to toggle it off and on. Even if only one sensor is visible in the graph, when the data is exported, all sensors will be included in the export for the time period selected. If a graphic is exported, only the sensor selected will be included in the image.



Example: Temp © and RH (%) turned off



Example: Zoom between 10:00 and 10:30 am for CONC and TWA

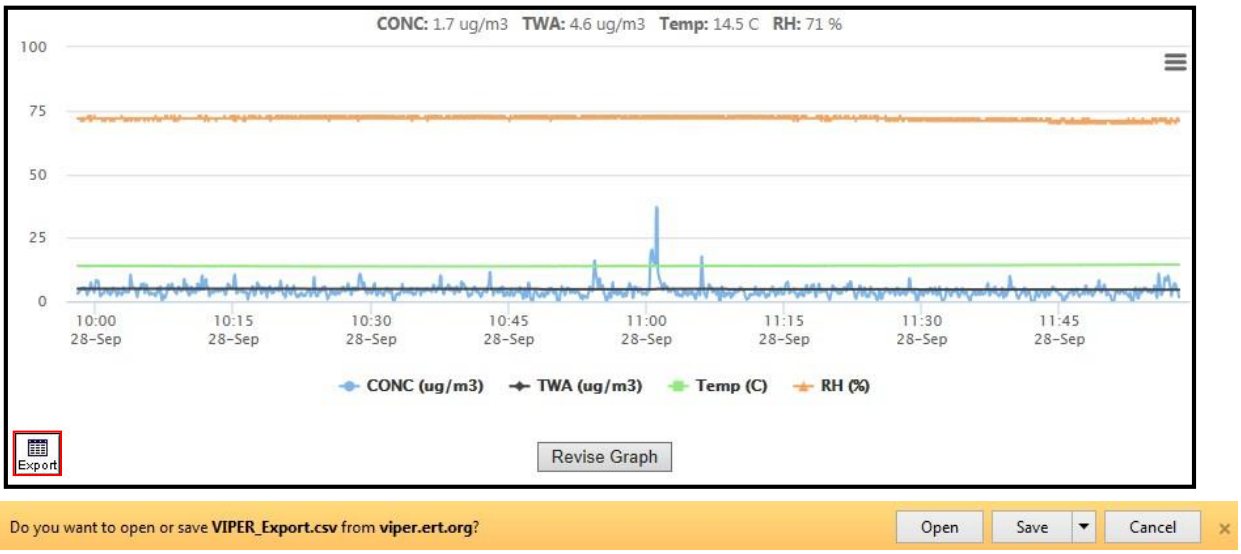


Example: Graph display between 10:00 and 10:30 am for CONC and TWA

Export Sensor Data, Print & Save Graphs

After you have generated your Sensor Data Graph, the data for that graph can be exported to a **.csv** file, which can be opened in MS Excel for further viewing, graphing, sorting, etc. The graph image can be printed or saved as a **png**, **.jpeg, SVG Vector** image or a **.pdf** document.

1. To export the data to a spreadsheet, click the **Export** button on the lower left side of the graph.



2. Depending on your browser configuration, you will be prompted to Open, Save, or Cancel.
3. Click **Save** and select 'Save' or 'Save As' or 'Open'.
4. The .csv file can be opened in Microsoft Excel and can be sorted, graphed, etc. in Excel.

Instrument	MeterApp_Config	Received_UTC	Received_Local	SensorName	SensorReading	SensorUnits	MeterApp_AlarmState	Latitude	Longitude
DustTrak	DustTrak LINC 162 EPAERT301 Wifi.xml	11/26/2019 14:0101	11/26/2019 9:0101	PM1	0.011	mg/m3	Green	40.79695	-81.364193
DustTrak	DustTrak LINC 162 EPAERT301 Wifi.xml	11/26/2019 14:0101	11/26/2019 9:0101	PM2.5	0.011	mg/m3	Green	40.79695	-81.364193
DustTrak	DustTrak LINC 162 EPAERT301 Wifi.xml	11/26/2019 14:0101	11/26/2019 9:0101	RESP	0.011	mg/m3	Green	40.79695	-81.364193
DustTrak	DustTrak LINC 162 EPAERT301 Wifi.xml	11/26/2019 14:0101	11/26/2019 9:0101	PM10	0.011	mg/m3	Green	40.79695	-81.364193
DustTrak	DustTrak LINC 162 EPAERT301 Wifi.xml	11/26/2019 14:0101	11/26/2019 9:0101	Total	0.011	mg/m3	Green	40.79695	-81.364193
DustTrak	DustTrak LINC 162 EPAERT301 Wifi.xml	11/26/2019 14:0101	11/26/2019 9:0101	PM1 TWA	0.002	twa	Green	40.79695	-81.364193
DustTrak	DustTrak LINC 162 EPAERT301 Wifi.xml	11/26/2019 14:0101	11/26/2019 9:0101	PM2.5 TWA	0.002	twa	Green	40.79695	-81.364193
DustTrak	DustTrak LINC 162 EPAERT301 Wifi.xml	11/26/2019 14:0101	11/26/2019 9:0101	RESP TWA	0.002	twa	Green	40.79695	-81.364193
DustTrak	DustTrak LINC 162 EPAERT301 Wifi.xml	11/26/2019 14:0101	11/26/2019 9:0101	PM10 TWA	0.002	twa	Green	40.79695	-81.364193
DustTrak	DustTrak LINC 162 EPAERT301 Wifi.xml	11/26/2019 14:0101	11/26/2019 9:0101	total TWA	0.002	twa	Green	40.79695	-81.364193

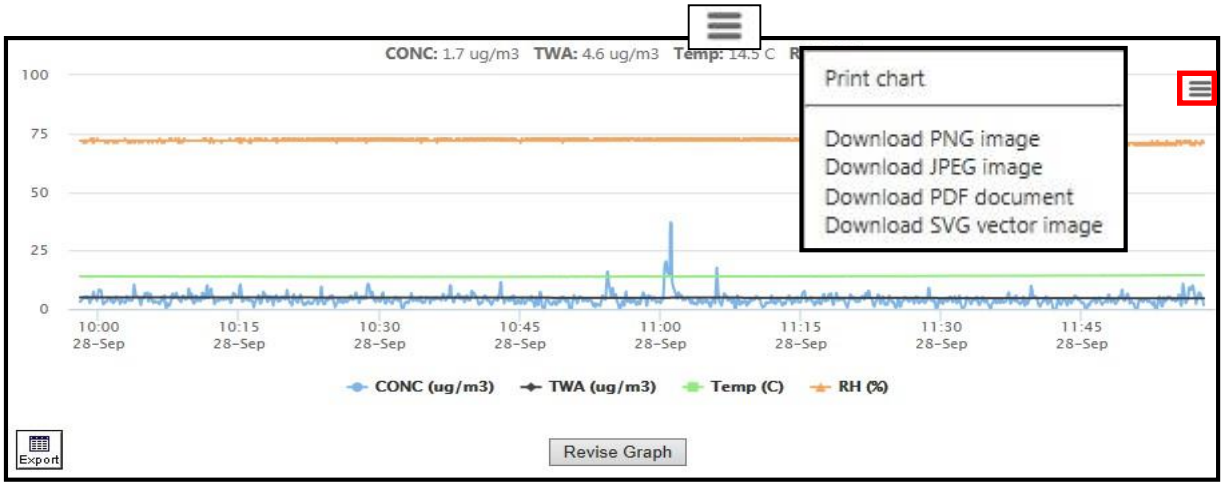
Even if the graph view was limited to a specific subset of sensors, the data export will still contain data for all of the sensors active during that time period.

NOTE: Make sure you format the Received_UTC and Received_Local column as m/d/yyyy h:mm:ss

Additional Data Export Options:

In addition to exporting data from an individual instrument via a deployment manager graph, several other data export options exist. Please refer to this document for details on data export options https://response.epa.gov/sites/5033/files/Viper%20Data%20Export%20Options.pdf or contact ERT Support via e-mail at ertsupport@epa.gov or via phone at 800-999-6990.

5. To print and/or save the Graphs/Chart click the



6. A menu will be displayed with the various options to print and save. See below for examples.

   Print Chart. Will open up users default printer dialog box

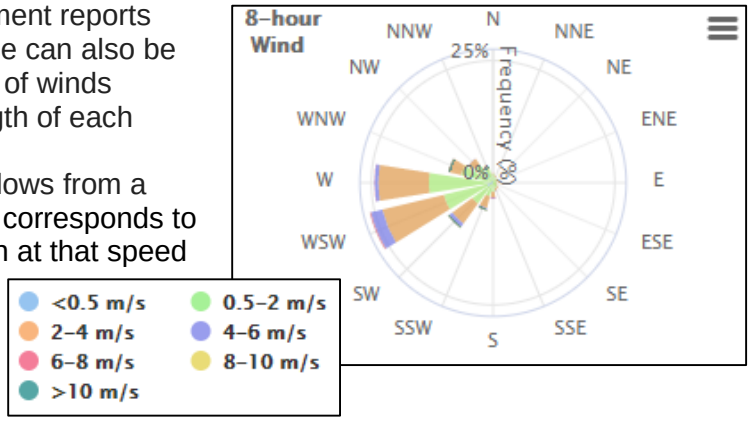
   Download PNG and JPEG image will prompt you to save and open up in Windows PhotoViewer

   Download PDF will prompt you to save and open up in Adobe

   Download SVG will prompt you to save and open up in all browsers as well as Scalable Vector Graphic Applications

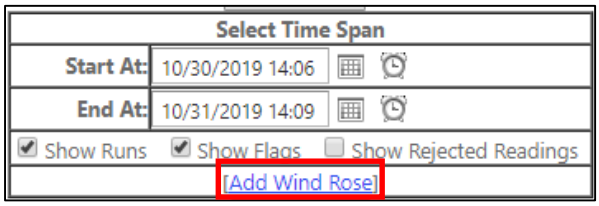
Wind Rose

In addition to the graphical chart, if an instrument reports Wind Direction and Wind Speed, a Wind Rose can also be displayed. A wind rose shows the frequency of winds blowing FROM particular directions. The length of each "spoke" around the circle is related to the frequency/percentage of time that the wind blows from a particular direction. The color of each spoke corresponds to the percentage of time that the wind was both at that speed and from that direction.



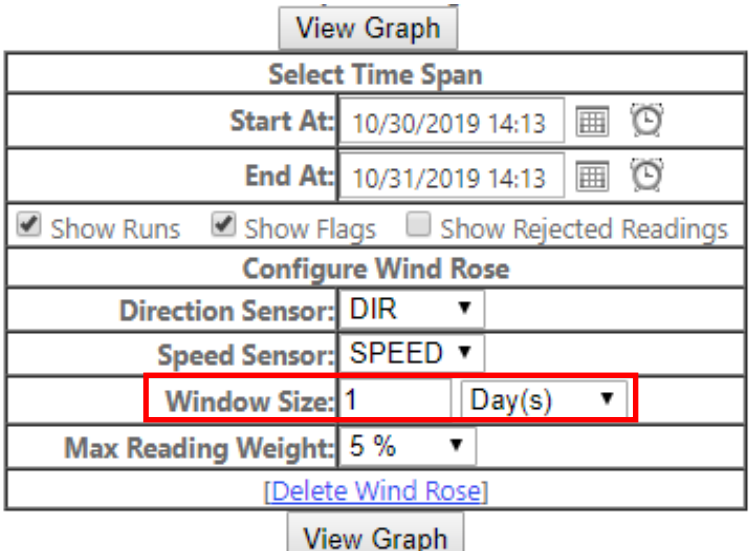
Enabling the Wind Rose:

1. From the Instrument Specific page (of an instrument that reports Wind Direction and Wind Speed), click the **Revise Graph** button



2. Click the "**Add Wind Rose**" link at the bottom of the graph time-span window

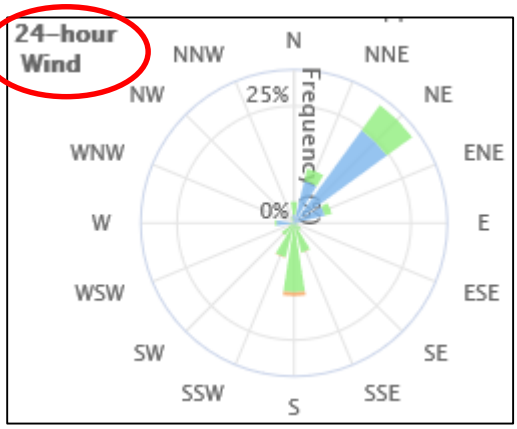
3. Complete the displayed fields:
   a. Select the **Direction** and **Speed** Sensors
   b. **Window Size is Required**



NOTE: When the Wind Rose is enabled, the ***Start At*** & ***End At*** values default to last [window size] of data. If the Wind Rose window size is 24 hours, the chart will default to showing the last 24 hours of data. You can still manually change the Start At & End At values to whatever you want, but when you do, the Wind Rose will always show its defined window size. The only impact those values have on the Wind Rose, is that by default, its window will end at the "End At" value.

The Wind rose only deviates from its defined window size when the user selects a range of data in the graph. The window size will be restored to its defined value with the "**Reset Zoom**" button is clicked.

Note: To determine if the wind rose is displaying the defined window size or a custom window size, look in the upper left corner of the wind rose to see if the window size *label* is present. If the window size label is present, the wind rose is displaying the defined window size. If the window size label is NOT present, the wind rose is displaying a custom window size that was selected by clicking and dragging in the graph.



Also, the wind rose and the chart always show data from the same time period, be it the wind rose's window size, or a time period selected manually by clicking and dragging in the graph. However, when a wind rose is added, both the graph and wind rose default to the Wind Rose window size instead of the system-wide default of 2 hours.

c. Max Reading Weight

Wind distribution percentages are time-weighted. By default, the maximum amount of the total window, that a single set of readings can represent, is 5%. Configuring a Max Reading Weight is useful in that:

- In the beginning of a run, the first set of readings doesn't dwarf the rest
- Data gaps and down time are not visible in a wind rose. If data-gap situations exist for a significant time period, they could bias the wind distribution percentages. The Max Reading Weight limits how much a data gap can bias the wind distributions percentages.

For example, given an 8 hour window, and only 1 hour's worth of 1 minute readings exists, the first set of readings won't be displayed as 7 hours of data. They will only be displayed as the "max weight" of the window.

Section 4 - Instrument Monitors, Alarms & Notifications

Once a Deployment has been created and runs are active and assigned, Instrument Monitor(s) can be added in Deployment Manager based on instrument sensor(s) and/or reading level(s). The term instrument monitor represents either alarms that are triggered, or completely new Sensor Values (such as TWAs, and Unit Conversions) that are created from original instrument readings received in deployment manager.

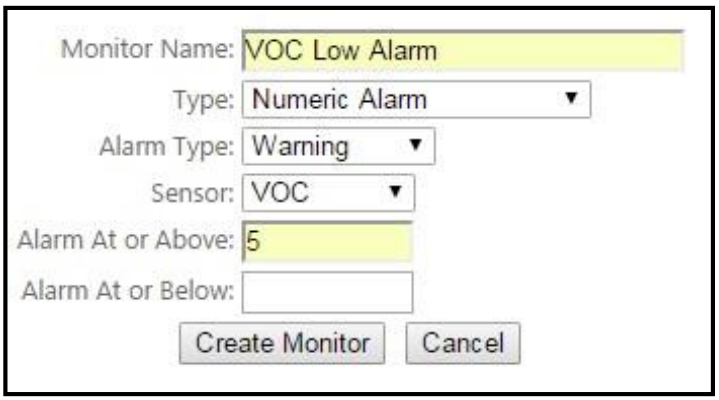
Alarm Notifications can be sent via email and/or text message (see Section Five) to one or many individuals.

NOTE: Instrument Monitors are configured by ERT Software Support. Please contact ERT Software Support at 1-800-999-6990 or via email at ertsupport@epa.gov to add, edit or modify instrument monitors.

Instrument Monitor(s)

Below is a description and example of each Instrument Monitor that can be created in Deployment Manager.

Numeric Alarm:



Numeric alarms are alarms based on numeric sensor readings (ex. VOC, LEL, PM2.5, etc.) for an individual instrument or set of instruments in Deployment Manager. Multiple numeric alarms can be created for each instrument and each instrument sensor.

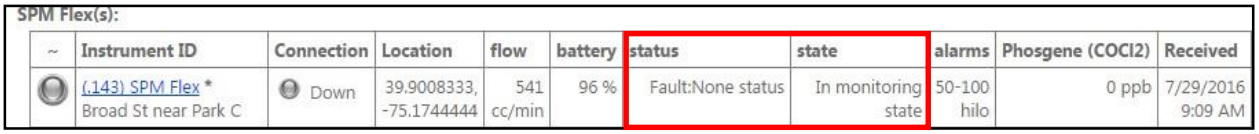
Alarms are configured as either “Warnings” or “Exceedances” and are associated with a target alarm level “at or above”/”at or below” or both. By setting both values on the same alarm, you effectively define a valid range of values. For example, an oxygen (O2) alarm might set “at or above” to 23.5, and “at or below” to 19.5. Numeric alarms work directly off of the values and units sent in the instrument data feed. As such, alarm values should be provided to ERT Support in the units being received in Deployment Manger. See the section below on Conversions if unit conversions are needed.

A Warning alarm will display in yellow on Deployment Manager and an Exceedance alarm will display in Red on Deployment Manager. These alarms can also trigger notifications (email or text), if desired.

String Alarm:

String Alarms allow for configuring alarms on non-numeric values reported by an instrument. For example, the SPM Flex instrument provides non-numeric operational information such as the instrument Status and State. Using the text values displayed for these fields, a string alarm can be set if the instrument is in a fault state. String Alarm text variables include:

- Is Equal to // Does Not Equal
- Contains // Does Not Contain
- Starts With // Does Not Start With
- Ends With // Does Not End With

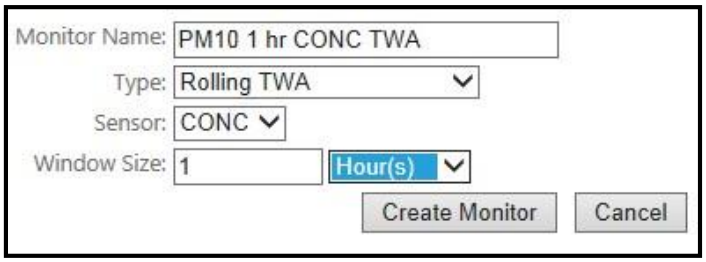


The example above will trigger if the Status Sensor Doesn't contain "None"

The example above will trigger if the "State" sensor does not equal "In Monitoring"

Rolling TWAs:

By choosing a sensor and a TWA "timeframe" (minutes, hours, days), a rolling TWA will be created for that instrument sensor. Multiple TWAs for the same sensor/instrument can be configured (i.e., 15 minutes, 1 hour, 8 hour, 24 hours, etc.).



Note: When a Rolling TWA is created, it appears in Deployment Manager as a new "sensor" alongside the other instrument sensor(s). Alarms and notifications can also be configured on Rolling TWAs.

DataRAM 4000(s):

~	Instrument ID	Connection	Location	RH	Temp	TWA	CONC	PM10 24 Hr CONC TWA	PM10 1 Hr CONC TWA	Received
	(123) DataRAM 4000 * Air Station 3	OK #	38.6573830, -90.2219150	34 %	26.5 C	15.1 ug/m3	5.8 ug/m3	8.017521 ug/m3	10.563806 ug/m3	9/28/2016 1:10 PM
	(124) DataRAM 4000 * Air Station 1	OK #	38.6555251, -90.2212950	36 %	23.5 C	15.6 ug/m3	2.5 ug/m3	5.004878 ug/m3	3.436806 ug/m3	9/28/2016 1:10 PM

Technical Note on Rolling TWA calculations:

A corresponding TWA is calculated for each instantaneous reading, representing the window of time preceding it. Each instantaneous reading within the window is weighted for the amount of the window which it represents, that is, each instantaneous reading weight is: (instantaneous reading time - previous instantaneous reading time) / window size.

- If no previous instantaneous readings exist, the instantaneous reading weight is: (instantaneous reading time - beginning of window) / window size = window size / window size = 1 (i.e. instantaneous reading is weighted for the full window size, that is, its weight is 1.)
- Once a weight is calculated for each reading, the instantaneous reading's corresponding TWA value is calculated as the summation of each constituent reading multiplied by its individual weight, that is: TWA = (reading1 * weight1) + (reading2 * weight2) + ... + (readingN * weightN).

Rolling TWA Alarms:

As previously mentioned, alarms and notifications can be configured on Rolling TWA values created in Deployment Manager.

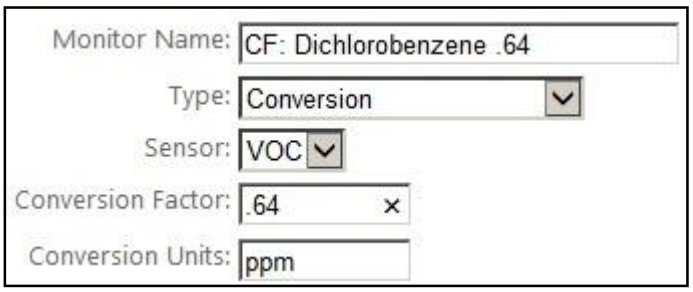
Instrument Monitors

Name	Type	Sensor	Settings	~
PM10 1 Hr CONC TWA	RollingTWA	CONC	Window: 1 Hour(s)	
PM10 1 Hr CONC TWA >150 ug/m3	RollingTWAAlarm	PM10 1 Hr CONC TWA	EXCEEDANCE - High Alarm: 150; Low Alarm: n/a	[Remove]
PM10 24 Hr CONC TWA	RollingTWA	CONC	Window: 1 Day(s)	
PM10 24 Hr CONC TWA >150 ug/m3	RollingTWAAlarm	PM10 24 Hr CONC TWA	EXCEEDANCE - High Alarm: 150; Low Alarm: n/a	[Remove]

[Add New Instrument Monitor] [ManageAlarm Notifications]

Example of Rolling TWA Alarms

Conversions:



Conversion factors can be applied to native sensor readings for a few different reasons. For example, conversion factors can be applied to display readings in different units than what is natively coming from the instrument. Conversion factors are also sometimes supplied by instrument manufacturers to better interpret the output from a sensor as it applies to a compound you know to be present. For example, RAE Systems provides conversion factors that can be applied to the VOC sensor of an AreaRAE to obtain readings specific to particular compound.

The example displayed below shows applying a conversion factor to the VOC sensor to display readings specific to Dicholorobenzene. It also shows a 15-minute TWA that created that corresponds to the Short Term Exposure Limit (STEL). Alarms and notifications can then be created when the STEL exceeds acceptable levels.

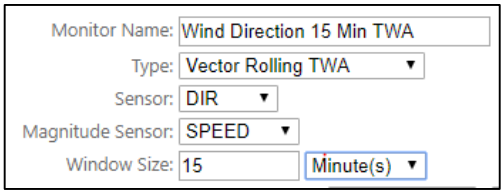
2) 15 Min TWA on Converted Value

1) Conversion Factor Applied

3) Alarm Set on 15 Min TWA Value

Name	Type	Sensor	Settings
15-min Corrected STEL	ConversionRollingTWA	CF: Dichlorobenzene .64	Window: 15 Minute(s)
8-hr TWA Alarm (dichlorobenzene)	ConversionRollingTWAAlarm	8-hr TWA Corrected	WARNING - High Alarm: 10; Low Alarm: n/a
8-hr TWA Corrected	ConversionRollingTWA	CF: Dichlorobenzene .64	Window: 8 Hour(s)
CF: Dichlorobenzene .64	Conversion	VOC	Factor: 0.64; Units:
STEL Alarm (5ppm dichlorobenzene)	ConversionRollingTWAAlarm	15-min Corrected STEL	WARNING - High Alarm: 5; Low Alarm: n/a

Vector Rolling TWAs:



Vector TWAs are primarily configured for Wind Direction when an instrument contains Meteorological readings or when a meteorological station or NOAA meter app is added to a Deployment. This type of TWA will show the average wind direction for the specified Window Size (time) taking into account the Wind Speed (Magnitude Sensor). If you don't use a magnitude (by selecting the Unity = 1 option), the data may be less meaningful because the weighting will not consider speed.

Note: Vector Rolling TWA is a true vector average. It is calculated using the 2nd method described at: http://www.ndbc.noaa.gov/wndav.shtml.

The image below shows the result of creating a Vector Rolling TWA for Wind Direction using Speed as the magnitude sensor. Two new sensors are created that apply the vectoring math. One sensor shows the Wind Direction which is identified by the **(d)** in the sensor name and the other shows the Magnitude which is identified by the **(m)** in the sensor name.

AreaRAE Pro(s):

~	Instrument ID	Connection	Location	SPEED	DIR	Temp	R.H	10-MIN WD Vector Rolling TWA (d)	10-MIN WD Vector Rolling TWA (m)
	(3001) AreaRAE Pro PRG2CAP - AreaRAE Pro - S/NW01A00000625	OK [Edit]	40.5107800, -74.3581100	2.1 m/sec	39 °	61 °F	99 %	25.000044 °	1.65709 m/sec

Magnitude Sensor:

The new magnitude sensor **(m)** available when a Vector Rolling TWA is created, gives you an idea of how dominant the average direction was during the TWA window. If the average magnitude is very close to zero (0), the average direction may not be very meaningful. Assuming the wind did not split its time coming from opposite directions, the "close to zero (0)" magnitude indicates that the wind was probably swirling in all directions. In either case, there really wasn't a dominant wind direction.

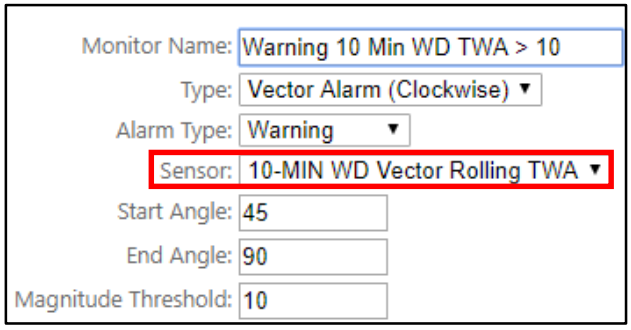
When there isn't a dominant wind direction, the Wind Rose is useful because it illustrates how quickly and often the wind came from each direction. See Section 3 for more information on the Wind Rose.

NOTE: If you are looking to identify low wind speed events – which might indicate that things aren't dispersing – you would use the traditional Rolling TWA on the speed sensor, and then apply a "low Limit" alarm to the resulting TWA sensor.

Vector Alarm (Clockwise):

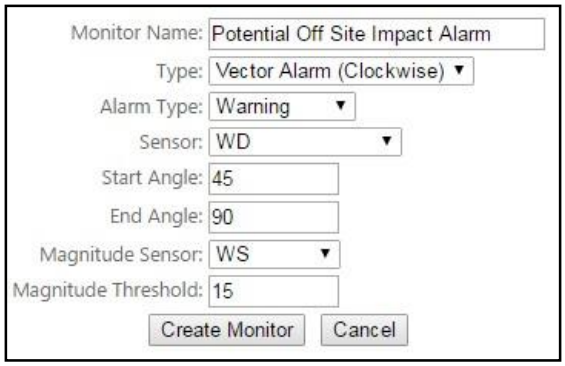
Vector Alarms are primarily configured for Wind Direction when an instrument contains Meteorological readings or when a meteorological station or NOAA meter app is added to a Deployment. Alarms can be created on the native Wind Direction/Wind Speed sensors or they can be created on any Vector Rolling TWAs that have also been created. If the magnitude threshold is greater than zero (0), this type of alarm will send notifications when the Wind Direction **comes FROM** a prevailing angle **AND** the speed/magnitude exceeds the specified threshold.

Creating a Vector Alarm on a Vector Rolling TWA, only the start/stop angles and thresholds need to be set since the Rolling Vector TWA already includes the WD and Magnitude Sensor (speed). Remember that the start and end angle represent the direction where the wind is coming FROM. The alarm value will be compared to the Vector Rolling TWA (m) sensor. If the magnitude threshold is greater than zero (0), this type of alarm will send notifications when the Wind Direction **comes FROM** a prevailing angle AND the Vector Rolling TWA Magnitude Sensor exceeds the specified threshold.

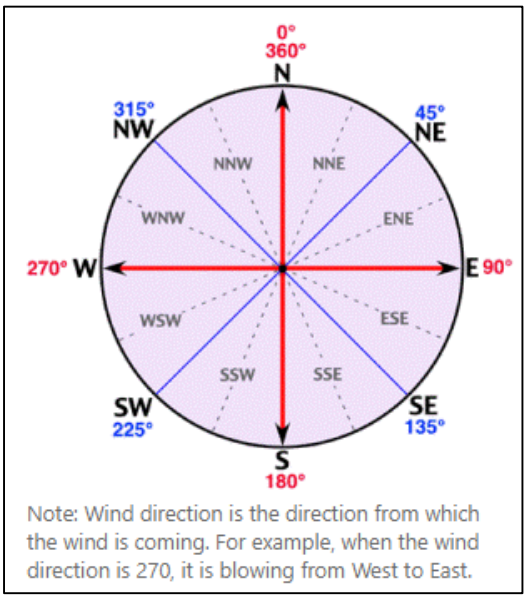


Creating a Vector Alarm on a native Wind Direction Sensor

As opposed to creating a Vector Alarm on a Vector Rolling TWA (above), when a Vector Alarm (Clockwise) is created from the native Wind Direction/Wind Speed sensors, no vector average calculation occurs. When applying a vector alarm to a native direction sensor, the only reason to specify a magnitude sensor is to specify a threshold for the speed as well. If the magnitude threshold is greater than zero (0), this type of alarm will send notifications when the Wind Direction **comes FROM** a prevailing angle AND the speed/magnitude sensor exceeds the specified threshold.



The graphic shown here can assist with determining the start and stop angles required when setting a Vector Alarm in deployment manager. Remember that the angle set represents where the wind is coming FROM.



Note: Wind direction is the direction from which the wind is coming. For example, when the wind direction is 270, it is blowing from West to East.

Example Instrument Monitors

Instrument Monitors

Name	Type	Sensor	Settings	~
Particulate Exceedance	Alarm	CONC	EXCEEDANCE - High Alarm: 30; Low Alarm: n/a	[Remove]
Particulate Warning	Alarm	CONC	WARNING - High Alarm: 25; Low Alarm: n/a	[Remove]

[Add New Instrument Monitor] [ManageAlarm Notifications]

Instrument Monitors

Name	Type	Sensor	Settings	~
CO >25 ppm	Alarm	CO	WARNING - High Alarm: 25; Low Alarm: n/a	[Remove]
LEL >5%	Alarm	LEL	WARNING - High Alarm: 5; Low Alarm: n/a	[Remove]
O2 <19.5 or >23.5	Alarm	OXY	WARNING - High Alarm: 23.5; Low Alarm: 19.5	[Remove]
VOC >2.5 ppm	Alarm	VOC	WARNING - High Alarm: 2.5; Low Alarm: n/a	[Remove]

[Add New Instrument Monitor] [ManageAlarm Notifications]

Instrument Monitors

Name	Type	Sensor	Settings	~
15-min Corrected STEL	ConversionRollingTWA	CF: Dichlorobenzene .64	Window: 15 Minute(s)	
8-hr TWA Alarm (dichlorobenzene)	ConversionRollingTWAAlarm	8-hr TWA Corrected	WARNING - High Alarm: 10; Low Alarm: n/a	[Remove]
8-hr TWA Corrected	ConversionRollingTWA	CF: Dichlorobenzene .64	Window: 8 Hour(s)	
CF: Dichlorobenzene .64	Conversion	VOC	Factor: 0.64; Units:	
STEL Alarm (5ppm dichlorobenzene)	ConversionRollingTWAAlarm	15-min Corrected STEL	WARNING - High Alarm: 5; Low Alarm: n/a	[Remove]

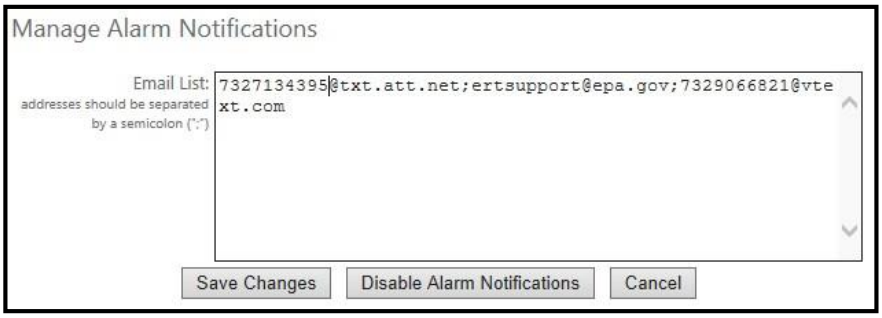
[Add New Instrument Monitor] [ManageAlarm Notifications]

Name	Type	Sensor	Settings
10-MIN RH TWA	RollingTWA	R.H	Window: 10 Minute(s)
10-MIN TWA Temp	RollingTWA	Temp	Window: 10 Minute(s)
10-MIN WD Vector Rolling TWA	RollingVectorTWA	DIR	Window: 10 Minute(s), with SPEED as magnitude
Harmful Wind Direction	VectorAlarm	DIR	WARNING - Between 45 and 90 degrees, clockwise, with SPEED as magnitude > 5

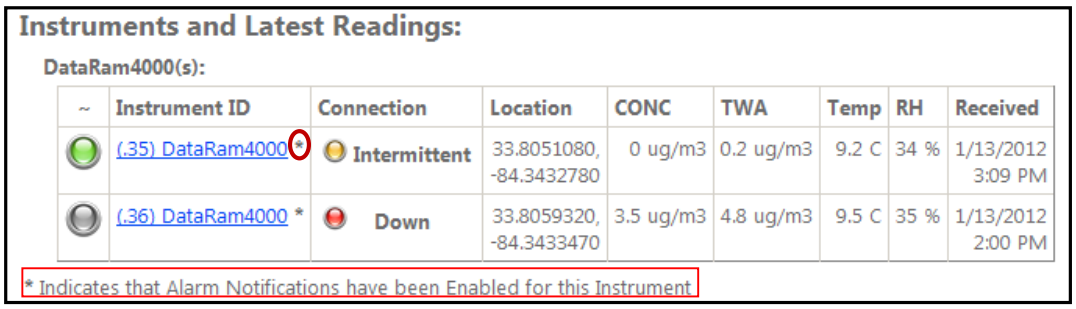
Alarm Notifications

Alarm Notification(s) enables a list of contact(s) to receive an email and/or text when a Deployment Manager Alarm is triggered for an instrument or multiple instruments.

NOTE: Alarm Notifications are configured by ERT Software Support, please call ERT Software Support at 1-800-999-6990 or via email at ertsupport@epa.gov.



Example: Email and Text Message List to receive notifications when Deployment Manager alarms are triggered.



Example: When viewing instruments in Deployment Manager, an InstrumentID followed by an asterisk (*) indicates that Alarm Notifications have been enabled for this Instrument.

Interpreting Alarm Notifications

An "Initial" alert email:

When a Deployment Manager alarm is triggered, an e-mail/text notification will be sent if notifications have been enabled for that alarm.

Alarm notifications will contain the following information:

- A direct link to that instrument in Deployment Manager
- Name of the Deployment
- The LINC number and instrument that generated the alarm reading
- Specific information about the alarm such as the alarm level, sensor that is alarming, reading value that caused the alarm and date/time of reading that caused the alarm.
- When to expect another email if the instrument remains in an alarm state
- Current readings. This will contain all sensors that are displayed in deployment manager for this instrument – not just the sensor in alarm state.

Subject: VIPER: Run 1721-20 - Instrument (.76) AreaRAE Alarm Alert

https://ertviper.org/DeploymentManager/ViewInstrument.aspx?RunIdentifier=1721-20&InstrumentID=%28.76%29%20AreaRAE

R02 American Cyanamid Site Deployment

(.76) AreaRAE - EPA Location 2
Pumping Station
All Times Eastern, DST Observed

Alarm Level Alarm Name Alarm Type Alarm Sensor ReadingID Reading Received Reading Latitude Reading Longitude Reading Sensor Reading Value Reading Units
---
WARNING VOC 0.5 ppm RollingTWAAlarm VOC 15-Min TWA 3818231 5/25/2014 12:15:58 PM 40.5509280 -74.5471480 VOC 15-Min TWA 0.553333 (from 16 readings) ppm

These alerts will expire after 30 Minute(s) .

Once all alerts expire, a confirmation email will be sent. If these alerts continue to be detected, a status update email will be sent in 1 hour(s).

Current Readings:
VOC 15-Min TWA: 0.553333 ppm
VOC: 0.4 ppm
Received: 5/25/2014 12:15:58 PM
https://ertviper.org/DeploymentManager/ViewInstrument.aspx?RunIdentifier=1721-20&InstrumentID=%28.76%29%20AreaRAE

An Alarm Update email

If an instrument remains in an alarm state on Deployment Manager, an Alarm Update e-mail will be generated. The first update will be generated if the instrument is still in an alarm state 1 hour after the initial e-mail. If the instrument continues to be in an alarm state after that, subsequent "Alarm" e-mails will be generated at the frequency displayed in the update e-mail. However, if all alarms clear, the "Cleared" e-mail will be generated immediately and not wait for "Update" timeframe.

NOTE: Each time a status update email is generated, the amount of time between emails doubles. i.e.: 1 hour, then 2 hours, then 4 hours, then 8 hours, then 16 hours, then 24 hours.

Subject: VIPER: Run 1721-20 - Instrument (.76) AreaRAE **Alarm Update**

https://ertviper.org/DeploymentManager/ViewInstrument.aspx?RunIdentifier=1721-20&InstrumentID=%28.76%29%20AreaRAE

R02 American Cyanamid Site Deployment

(.76) AreaRAE - EPA Location 2
Pumping Station
All Times Eastern, DST Observed

Alarm Level Alarm Name Alarm Type Alarm Sensor ReadingID Reading Received Reading Latitude Reading Longitude Reading Sensor Reading Value Reading Units
---
WARNING VOC 0.5 ppm RollingTWAAlarm VOC 15-Min TWA 3820056 5/25/2014 1:14:58 PM 40.5509280 -74.5471480 VOC 15-Min TWA 0.610222 (from 16 readings) ppm

These alerts will expire after 30 Minute(s) .

Once all alerts expire, a confirmation email will be sent. If these alerts continue to be detected, a status update email will be sent in 2 hour(s).

Current Readings:
VOC 15-Min TWA: 0.610222 ppm
VOC: 0.0 ppm
Received: 5/25/2014 1:14:58 PM

https://ertviper.org/DeploymentManager/ViewInstrument.aspx?RunIdentifier=1721-20&InstrumentID=%28.76%29%20AreaRAE

An Alarm Cleared email

Once **all** alarms have cleared for an instrument, an Alarm Cleared e-mail will be generated.

****

Subject: VIPER: Run 1721-20 - Instrument (.76) AreaRAE **Alarm Cleared**

https://ertviper.org/DeploymentManager/ViewInstrument.aspx?RunIdentifier=1721-20&InstrumentID=%28.76%29%20AreaRAE

R02 American Cyanamid Site Deployment

(.76) AreaRAE - EPA Location 2
Pumping Station
All Times Eastern, DST Observed

All Alerts for this instrument have expired.

Current Readings:
VOC 15-Min TWA: 0.133333 ppm
VOC: 0.0 ppm
Received: 5/25/2014 8:52:58 PM

https://ertviper.org/DeploymentManager/ViewInstrument.aspx?RunIdentifier=1721-20&InstrumentID=%28.76%29%20AreaRAE

Note: If an instrument has multiple alarms defined, an "Alert" message will be sent for each alarm as it is triggered. The status update cycle/schedule is established by the first alarm and remains unchanged if additional alarms are subsequently triggered. Multiple alarms triggered at different times won't affect the original status update schedule which was established by the first alert.

Connection Status

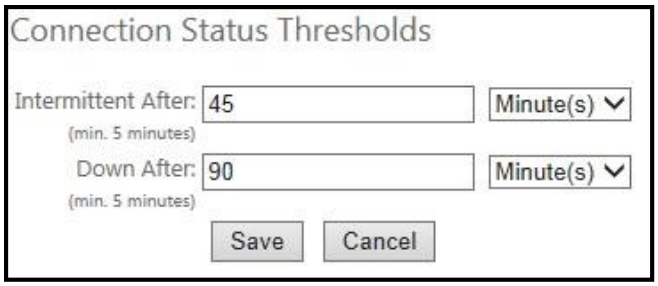
As described in Section Two, by default, Deployment Manager status indicator lights will remain green as long as a reading has been received within the last 45 minutes. If the connection turns yellow, the latest reading was received between 45 and 90 minutes ago (Intermittent) and if the last reading is more than 90 minutes old, the connection light turns red (Down).

Connection Status thresholds are instrument specific, so each instrument can be configured to show as intermittent or down at independent intervals with the minimum interval being 5 minutes.

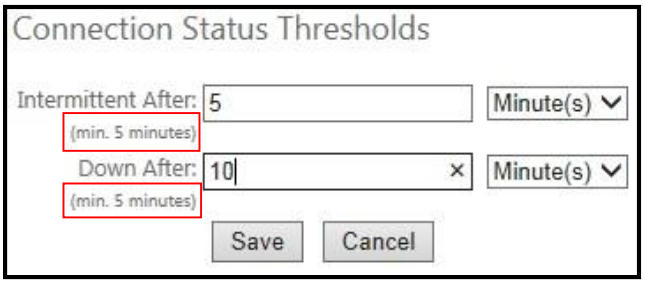
It might be helpful to change the connection status thresholds when instruments collect readings at different intervals. For example, if a NOAA meter app is added to a deployment, those readings may only be updating every hour. As such, the default connection status indicator lights will turn Red in deployment manager unless it is configured for a longer threshold. Changing Connection Status thresholds can also be important when Connection Status alarms are configured in Deployment Manager because Connection Status Alarms are RUN specific rather than INSTRUMENT specific and apply to any instrument that enters an intermittent or down status in that Run.

NOTE: Connection Status Thresholds are configured by ERT Software Support, please call ERT Software Support at 1-800-999-6990 or via email at ertsupport@epa.gov.

Example Connection Status changes



Example: Default Connection Status



Example: 5 minute/10 minute

Note: 5 minutes is the minimum threshold time.

Connection Status Alarms

Similar to Instrument Monitor Alarm Notifications, Connection Status Alarm Notification(s) enables a list of contact(s) to receive an email and/or text when an instrument connection changes to either Intermittent or Down based on the threshold intervals set as described in the section above.

Connection Status Alarms are not instrument specific – **they are RUN specific and apply to all instruments in a run**. If any instrument in a run triggers a connection alarm, an e-mail will be generated.

NOTE: Connection Status Alarms are configured by ERT Software Support, please call ERT Software Support at 1-800-999-6990 or via email at ertsupport@epa.gov.

Example: Alarm Notifications and Connection Status Notifications have been enabled

Example Connection Status Notification

1. An **"Initial"** alert email:

   When a Deployment Manager alarm is triggered, an e-mail/text notification will be sent if notifications have been enabled for that alarm.

Alarm notifications will contain the following information:

- A direct link to that instrument in Deployment Manager
- Name of the Deployment
- The Connection Monitor LINC number and Run that generated the alarm reading
- Specific information about the alarm such as the alarm level, alarm name, sensor that is alarming, date/time of the reading that caused the alarm and reading value (Intermittent or Down) that caused the alarm.
- When to expect another email if the instrument remains in an alarm state
- Current readings. This will contain all sensors that are displayed in deployment manager for this instrument – not just the sensor in alarm state.

** Similar to Alarm Notifications, after an initial alert e-mail, an update and/or cleared e-mail will be generated depending on the duration of the event that triggered the initial alert.

Example Connection Monitor Alarm

Subject: VIPER: Run 2873-1 - Instrument (.3001) Connection Monitor Alarm

https://viper-qa.ert.org/DeploymentManager/ViewInstrument.aspx?RunIdentifier=2873-1&InstrumentID=%28.3001%29%20Connection%20Monitor&FromAlarmServer=true

R09 AMCO Deployment

(.3001) Connection Monitor - Run 2830-7
All Times Pacific, DST Observed

Alarm Level Alarm Name Alarm Type Alarm Sensor ReadingID Reading Received Reading Latitude Reading Longitude Reading Sensor Reading Value Reading Units

WARNING (.101) Met One Connection StringAlarm (.101) Met One 331906 10/2/2016 5:56:23 AM 0.0000000 0.0000000 (.101) Met One Down
WARNING (.37) MultiRAE Connection StringAlarm (.37) MultiRAE 331951 10/2/2016 5:58:33 AM 0.0000000 0.0000000 (.37) MultiRAE Down
WARNING (.3001) NOAA NWS Observations Connection StringAlarm (.3001) NOAA NWS Observations 331966 10/2/2016 5:58:33 AM 0.0000000 0.0000000 (.3001) NOAA NWS Observations Intermittent

These alerts will expire after 30 Minute(s).

Once all alerts expire, a confirmation email will be sent. Otherwise, the next Status Update will be sent at 10/2/2016 9:52:07 PM.

Current Readings:
(.101) Met One: Down
(.37) MultiRAE: Down
(.39) MultiRAE: OK
(.40) MultiRAE: OK
(.95) MultiRAE: OK
(.97) MultiRAE: OK
(.3001) NOAA NWS Observations: Intermittent

Received: 10/2/2016 6:00:42 AM

https://viper-qa.ert.org/DeploymentManager/ViewInstrument.aspx?RunIdentifier=2873-1&InstrumentID=%28.3001%29%20Connection%20Monitor&FromAlarmServer=true

Section Five – Linking Instrument Sensors to Previous Runs

Sensors and calculated-value monitors (TWA, VectorTWA, Conversion, etc.) can be linked to sensors and calculated-value monitors in previous runs. Linking sensors expands the window on how much data can be pulled for that instrument to cover the entire "chain" of linked sensors. This minimizes the impact of the operational need to stop and start new runs. For example, if a run was stopped to replace faulty equipment, sensors from the new run can be linked to the prior run. When a sensor is linked, data from the previous run is visible in the instrument chart. Also when a sensor is linked, data from the previous run is available for any Time-Weighted-Average (TWA) calculations that are created in Deployment Manager

NOTE: Linking Sensors is configured by ERT Software Support, please call ERT Software Support at 1-800-999-6990 or via email at ertsupport@epa.gov.

Sensor linking is flexible and allows for changes in instruments, Viper LINCS and Survey Controller IDs.

Requirements for Sensor Linking

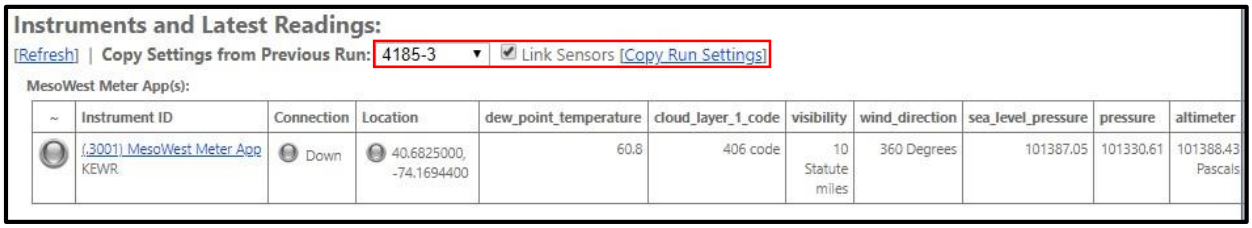
- Sensors must both be in the same Deployment
- The earlier sensor's Run must stop at or before the beginning of the later sensor's run – runs cannot overlap.

Other Considerations when Linking Sensors

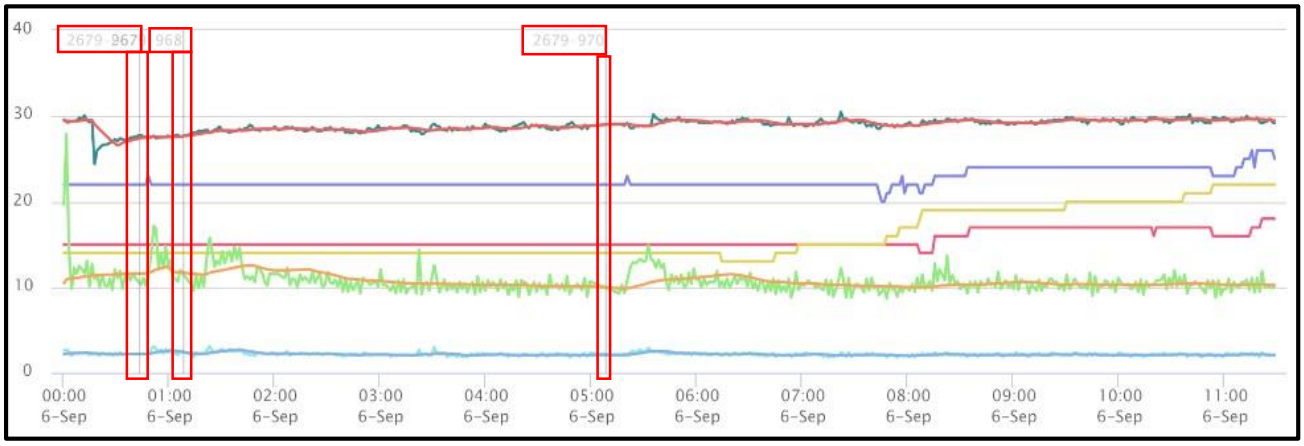
- TWA's and Sensor Units. If TWAs are created for a sensor and the instrument is swapped for an instrument that reports readings in different Units, do not link the sensors.
    - For example, if the earlier sensor measured VOC in ppb, and new run is measuring in ppm, the new run's TWA will mistake the earlier run's ppb readings for ppm. That will bias the TWA by a factor of 1,000, until the earlier run's readings slip out of the sliding window. If TWA Alarms were configured, they may unexpectedly report an alarm state.
    - Graphing may also make incorrect assumptions about the units of measure, at different times.
- Changes in Sensor Names (ammonia vs NH3), changes in Telemetry LINC numbers, or changes in Generic CAP Instrument IDs from one Run to the next all require an e-mail to ERTSupport so linking can be correctly configured across Runs.

Linking at the Run Level

Linking can be done at the “Run” level as show by the checkmark in the Link Sensors prompt below. Deployment Manager will automatically link any sensors in the current run with matching sensors in whichever run is specified in the “Copy Settings from Previous Run” drop-down box. This includes any matching TWAs, Conversions, Vector TWAs, etc.



Once the sensors are linked to a previous run, the graph will show the data from all linked runs. When you click ‘Revise Graph’, the ‘Start At’ value can be set all the way back to the beginning of the earliest linked run. When the graph is drawn, each sensor will include data from all linked runs that apply to the time range selected, with a thin vertical line indicating where the different runs start. The following is an example of a graph showing linked runs. The vertical lines indicate where one run ends and another begins, and the previous run’s identifier is shown at the top of the chart just left of the line.



Linking at the Instrument Level

If linking needs to be customized, rather than using the option above to link sensors at the Run level, sensors can be linked at the individual instrument level. To link sensors at the individual instrument level, select an instrument, use the "Latest Reading: Edit" button below the map and select the previous run and sensors to be linked. Below are some examples when a run needs to be linked at the instrument level:

Changes in Sensor Names:

For example, an instrument reports Ammonia as one of its sensors. That instrument breaks and a new instrument is deployed which reports the sensor as NH3. These sensors can still be linked at the "instrument" level. Also, if the original instrument had a Deployment Manager TWA created on the Ammonia sensor and the new instrument had a matching Deployment Manager TWA created on the NH3 sensor, those will also be linked across runs when linking is enabled. After the initial linking is done, the new instrument can be linked in subsequent runs at the "Run" level.

Changes in Telemetry LINC Numbers (Instrument ID):

For example, telemetry LINC # 153 has been at location 1 for two months. That LINC breaks and LINC # 101 is deployed to that location. At the "instrument" level, LINC 153 can be linked to LINC 101. After that change in linking is done, subsequent linking for new runs can be done at the "Run" level.

Changes in Generic CAP ID (Instrument ID):

When using PRG2CAP or any Generic CAP source, there is the potential that from Run to Run, a different "Instrument ID" number can be assigned to an instrument. The best way to minimize this potential is to start subsequent runs from a template and Survey Controller will do its best to reuse existing generic "instrument ID" numbers. If an "instrument id" changes from one run to the next, linking must be done at the instrument level and not the Run level.

Example of linking at the Instrument Level

Below is an example of linking at the instrument level. In this example, an AreaRAE Pro's Met sensors are linked to a WeatherPak's Met Sensors in a previous run – simulating an AreaRAE replacing the WeatherPak at that location.

Sensor Name	Is Visible	Show In Chart	Chart Aggregation *	Linked to #		
DIR	☑	☑	Maximum	4508-3	(.131) WeatherPak	iWD
R.H	☑	☑	Maximum	4508-3	(.131) WeatherPak	rHumidity
SPEED	☑	☑	Maximum	4508-3	(.131) WeatherPak	iWS
Temp	☑	☑	Maximum	4508-3	(.131) WeatherPak	iAT

Section Six – Annotating Readings in Deployment Manager

The Annotate feature of Deployment Manager allows for errant readings to be flagged and/or excluded from any TWA Calculations created in Deployment Manager. Scenarios such as errant readings captured due to field calibration or equipment movement are common situations where those readings should be flagged and removed from TWAs as to not bias the calculation with faulty readings. Another scenario when a reading should be flagged and excluded from any **TWA** calculation is when there is down-time or a significant data gap time and the first reading received after the gap is **0**. The first reading received after a data gap will be weighted to represent the data gap and could cause a low bias on the TWA.

Annotating can also be used to mark a significant event in the data.

NOTE: Annotating/flagging readings is configured by ERT Software Support, please call ERT Software Support at 1-800-999-6990 or via email at ertsupport@epa.gov.

Creating Flag Values

Overview:

Flags are user-defined and the "R" value is reserved for Rejected Readings. Any readings assigned the "R" flag also need to have another flag assigned that explains the rejection. The table below is an example of several flags created for a run.

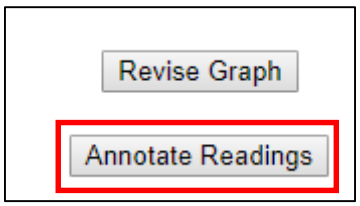
QA Flag	Description
R	Rejected; Reading is ignored by charting and analytics (e.g. Alarms and TWA's)
C	Calibration Bias
T	Telemetry Error
D	Sensor Drift

Flag Details:

1. Flags are user defined
2. Although Flags can be up to 20 characters long, we recommend 1-3 characters so that they fit in the chart.
3. When Flags are created, they are specific to the Run in which they are created. Flags can be copied from one Run to another in order to keep consistency with flag names.
4. A run can have a maximum of 25 Flags.
5. The QA Flag itself shows in the graph. Though the flag description is not displayed directly on the graph, it does appear in a table below and to the right of the graph. That table is also included in the exports. When exporting from the View Instrument page, a table is included at the bottom of the CSV, which lists the flags that were referenced by one or more exported readings, as well as those flags' descriptions. When exporting at the server, either via scheduled export or Data Manager, relevant flag definitions are included at the root of the zip file, in a file named "QA FLAG DEFINITIONS.csv"

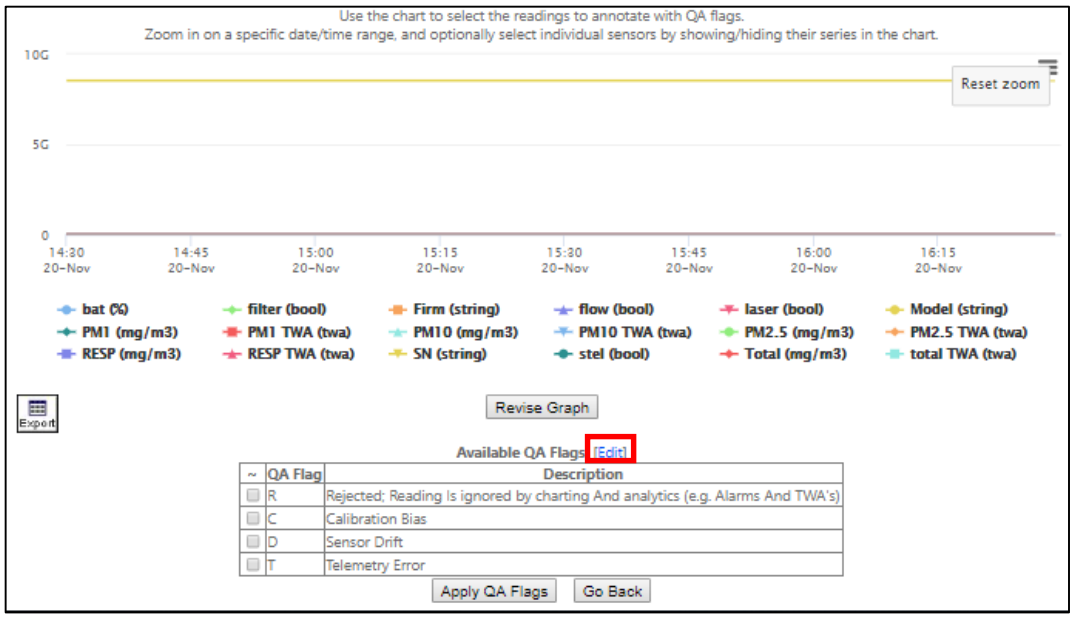
Setting Annotation Flags

1. Select the instrument with readings to be annotated
2. On the instrument-specific page, select the Annotate Readings button below the graph

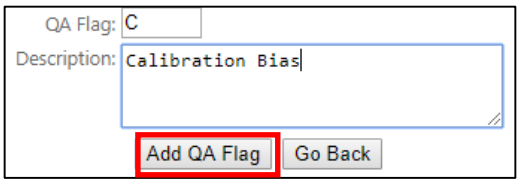


3. Click the **Edit** button below "Revise Graph" to add a new Flag Value.

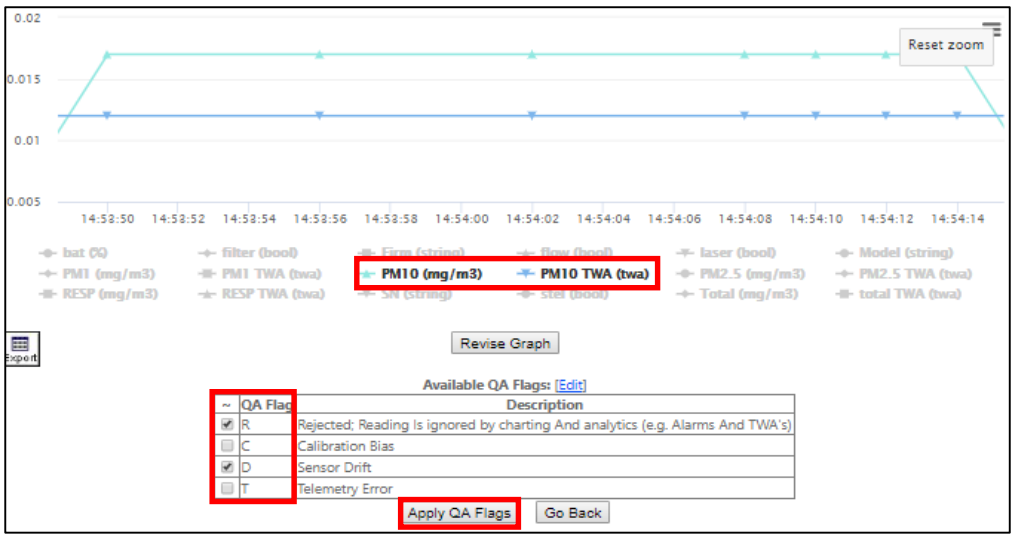
   NOTE: If the Flag needed is already in the list of available flags, skip to step 5. If the flag needed has been used in a prior run, you can import flags to keep consistency among runs. See the section on IMPORTING FLAGS on P. 44.



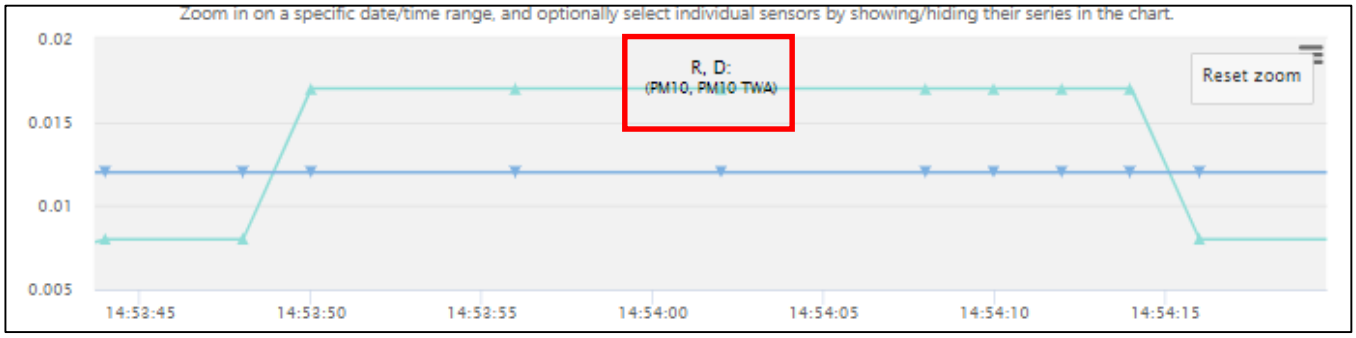
4. Enter a Flag code and description and click the "Add QA Flag" button. Remember if you are using the **Rejected** flag, you also need to include a second flag that represents the reason the readings are rejected.



5. Select the readings to be annotated by zooming in on the graph or by using the "revise graph" button and turn the appropriate sensors on or off. See section 3 for additional details about revising the chart.
6. When the chart displays only the readings needing to be flagged, put checkmarks in the appropriate flags and click the "Apply QA Flags" button

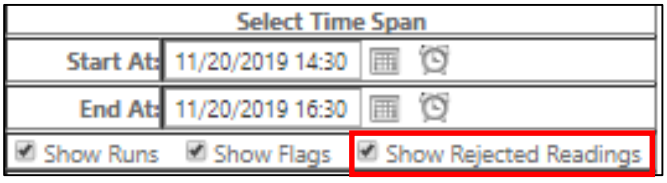


7. After applying the QA Flags, they will be displayed in the graph. Also, the flag sensor and range details will be displayed below the graph.



8. When a flag has been applied, it can be removed by using the Undo button. Applying flags can trigger a number of background operations, which can take several minutes to complete. Once those background operations have completed, the Undo button will be active.

9. Although the "Rejected Flag (R)" shows in the graph, the actual readings associated with the rejected records will not be included in the graph unless you use the "Revise Graph" button and put a checkmark in "Show Rejected Readings box.



By default, the graph will indicate that readings were rejected, without allowing those rejected readings to impact the scale of the y-axis. The scale of the y axis is automatically determined by values of the readings being graphed.

10. When the graph data is exported, all readings will be exported regardless if the “Show Rejected Readings” checkmark is added or not. There will be a column in the export with the Flag values.

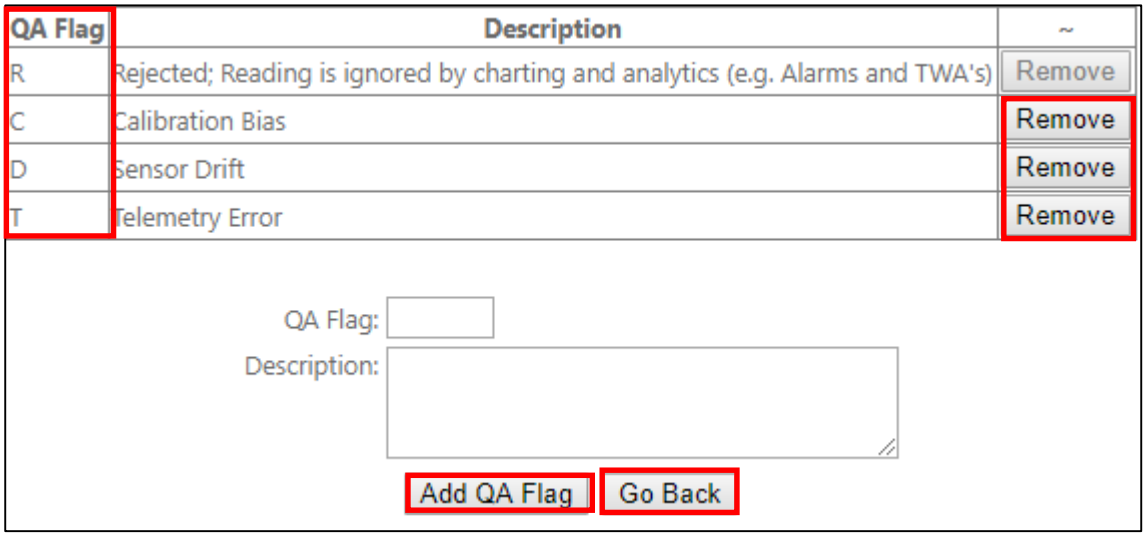
Received_Local	SensorName	SensorReading	SensorUnits	Latitude	Longitude	FLAGS
11/20/2019 14:53:44	PM10	0.008	mg/m3	41.843514	-89.489172	D,R
11/20/2019 14:53:44	PM10 TWA	0.012	twa	41.843514	-89.489172	D,R
11/20/2019 14:53:48	PM10	0.008	mg/m3	41.843514	-89.489172	D,R
11/20/2019 14:53:48	PM10 TWA	0.012	twa	41.843514	-89.489172	D,R
11/20/2019 14:53:50	PM10 TWA	0.012	twa	41.843514	-89.489172	D,R
11/20/2019 14:53:50	PM10	0.017	mg/m3	41.843514	-89.489172	D,R

Importing Flags from an earlier Run

If Flags have been added to earlier runs, they can be copied forward to current runs.

1. Select an instrument in the current Run.
2. Click the “Annotate Readings” button
3. Click the Available QA Flags “Edit” link
4. Click the “Import QA Flags from Other Runs” button

5. Any Flags used in prior runs will be added. At this point you can **Remove** any unnecessary Flags for this run, **Add** additional Flags or “**Go Back**” to assign flags in the current Run.



Additional info: Identifying Which Readings To Annotate/Flag

Using the Graph

1. In Deployment Manager, navigate to the Instrument Page and select the Revise the Graph to view all readings. (see Section 3 for instructions on revising the graph)
2. Zoom in until only the readings needing to be flagged are displayed

Using a Data Export

1. In Deployment Manager, navigate to the Instrument Page and use the “Revise Graph” button to view all readings.
2. Export the data and use MS Excel to identify the readings needing to be flagged
3. Note the Sensor/s, Start Date and Time and Stop Date and Time that need to be annotated and return to the graph to zoom to those dates/times.

Identifying TWAs with Data Gaps immediately followed by a zero (0) reading

1. Follow the steps above but zoom in until the only visible reading is the zero (0) that was received after the down time.
2. All of the sensor’s readings at that time are exactly zero (0)
3. Note the Sensor/s, Start Date and Time and Stop Date and Time

NOTE: When a Rolling TWA is calculated for period of time that includes a data gap, the first reading after the gap is assumed to be representative of the missing data, and weighted to represent the gap. If, by chance, that reading is not reasonably representative of the gap, it can be rejected, and thereby removed from the TWA calculation to allow the next reading to represent the gap.